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APPENDIX A
to the
RECORD OF DECISION

Final Environmental Impact Statement
on
Management for the Northern Spotted Owl
in the National Forests

RESPONSE TO PUBLIC COMMENT ON THE
FINAL ENVIRONMENTAL IMPACT STATEMENT

Following the publication and distribution of the FEIS, sixteen (16) comment letters were received through March 3, 1992. These comments are printed here in their entirety, verbatim. Spelling and typographical variants are as they appeared in the originals. Specific addresses and telephone numbers are not included. Comments are presented in order of their receipt.

Responses to these comment letters are displayed with each letter.

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Department of
Agriculture**



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RESPONSE TO COMMENTS RECEIVED FROM VERNE W. TERWILLIGER

The following indented text is a verbatim representation of the letter of January 27, 1992 from Verne W. Terwilliger addressed to Jerald Hutchins.

Jerald Hutchins
Spotted Owl EIS team Leader

1-27-92

Dear Sir

A few months ago I wrote you about a nesting box for the spotted owl. Sat[urday] I received a copy of the Summary of the Final Environmental Impact Statement. In reading it I did not find any reference to a nesting box program as a means of increasing the nesting possibilities in clear cut areas.

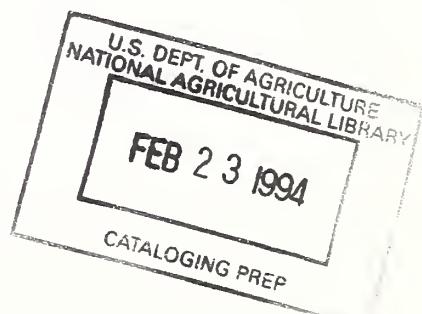
Is it possible that such a easy way of saving the spotted owl is not what is wanted? The nesting box worked for the wood duck, when most people laughed at the program. It was so successful that now we have hunting season on the wood duck again.

Maybe we should classify the spotted owl as a game bird, then the sportsmen would get busy and build boxes.

Yours Truly,
/s/ Verne W. Terwilliger

Reply - This issue was addressed in the FEIS, but the issue was not specifically discussed in the summary to the FEIS. The issue was addressed, in part, in the response to the fourth comment on page L-A-32 of the FEIS which states in part: "Artificial propagation and artificial habitat development are available options. However this type of intensive hands-on management is usually used as a last resort to save a species from extinction."

It is unlikely that the spotted owl will continue to persist well distributed throughout its range unless adequate amounts of habitat capable of supporting all their life needs are present. The habitat requirements for roosting and foraging, as well as nesting are complex. If nesting sites were a significant and isolated limiting factor in spotted owl populations, (and existing research does not indicate this) nest boxes would be seriously considered.



RESPONSE TO COMMENTS RECEIVED FROM DAVID H. KRUSE

The following indented text is a verbatim representation of the letter received January 29, 1992 from David H. Kruse, CDP addressed to Jerald N. Hutchins.

January 26, 1992

Jerald N. Hutchins
Spotted Owl EIS Team Leader
USDA-Forest Service
Portland, Or 97208

Dear Mr. Hutchins:

Thank you for sending me a copy of the Summary Final Environmental Impact Statement on Management for the Northern Spotted Owl in the National Forests.

I have watched the GOD SQUAD hearing with interest. It seems that the Fish and Wildlife Department is trying to present factual information while the BLM is just being a spokesman for the interests of the timber industry and the Bush administration.

I support a balance between the environment and jobs. I oppose placing the jobs in the timber industry above those in fishing, utility, farming or tourist industries. The spotted owl is not the real issue. This problem is just an indication of how poorly our natural resources have been managed by the US Department of Agriculture.

Please place more emphasis on jobs in the fishing and tourist industry. These jobs would seem to line up more closely with environmental protection.

The overgrazing by cattle is also being done at the expense of the environment and jobs in the fishing and tourist industries.

Now that wheat prices are rising, we need to support that industry. Without our forests, they will lack the rainfall and irrigation necessary to support their crops.

Clearly our fishing industry is suffering in part to overcutting our forests and overgrazing our public lands. The cattle and timber industries are destroying the fishing industry.

Again, my plea is for a balance.

Sincerely,
/s/
David H. Kruse, CDP
Gladstone, OR 97027

Reply - This comment does not lend itself to a specific response.

RESPONSE TO COMMENTS FROM JOSEPH B. ELY

The following indented text is a verbatim representation of the letter received January 29, 1992 from Joseph B. Ely, Retired Forester addressed to Jerald N. Hutchins.

Salem, Or 97302
January 26, 1992

Jerald N. Hutchins, Team Leader
Northern Spotted Owl DEIS
PO Box 3623
Portland, Or 97208-3623

Your DEIS on the spotted owl lists four alternatives. Yesterday the Statesman Journal newspaper stated that there are five, but did not describe the fifth.

I am curious to know what the fifth alternative is.

In my letter of October 2, I recommended as a fifth alternative, the management of all the public forest in the Douglas fir region (except for statutory wilderness) on a sustained yield basis with a rotation age of biological maturity plus. I repeated this recommendation verbally at your Salem hearing on October 17.

/s/

Joseph B. Ely, Retired Forester

Reply - A copy of the FEIS was mailed to Mr. Ely, and it will explain the fifth alternative. The comment regarding extended rotation ages was addressed in the response to the second comment on page L-A-12 of the FEIS, and in the response to the first comment on page L-A-47, which states: "The ISC Strategy did identify the need to grow future owl habitat. Stand management techniques such as extended rotation and commercial thinnings will undoubtedly be explored through research and experimentation under ISC Strategy recommendations. Many of the currently available silvicultural practices that leave various structural components within the stand should contribute to spotted owl habitat earlier than even-aged plantations. However, the complete set of structural components necessary for spotted owl nesting, roosting, and foraging habitat is not yet fully understood. Until critical components are identified, it is difficult to demonstrate that stands can be maintained silviculturally.

RESPONSE TO COMMENTS FROM RICHARD E. BLAKE

The following indented text is a verbatim representation of the letter received January 30, 1992 from Richard E. Blake addressed to Jerald N. Hutchins.

25 Jan 1992

I am requesting a copy of the two volume Final Environmental Impact Statement and the Record of Decision on the Spotted Owl.

The US Forest Service has an outstanding job on the spotted owl issue when we look at all of the outside interests and emotions on this issue. Some day our great great great great grandchildren may understand as they are able to view a Northern Spotted Owl.

Respectfully
Richard E. Blake

Reply - This comment does not lend itself to a specific response. A copy of the FEIS was mailed to Mr. Blake.

RESPONSE TO COMMENTS RECEIVED FROM THE
OREGON NATURAL RESOURCES COUNCIL

The following italicized text is a verbatim representation of the letter received from the Oregon Natural Resources Council addressed to Jerald N. Hutchins and dated January 30, 1992.

Oregon Natural Resources Council
Western Regional Office
Eugene, Oregon 97401

January 30, 1992

Subject: ONRC Comments on FEIS on Management of the Northern Spotted Owl in the National Forests

Dear Mr. Hutchins and the EIS Team:

We still have serious concerns with Spotted Owl FEIS. Our comments follow:

[*R1] 1. In revising Forest Plans, 36 CFR § 219.36(d) requires analysis of proposed plan revisions to "adequately disclose trade-offs and to make an informed decision, limiting selection of analytical procedures to generally accepted methods." In the case of the present FEIS, I feel that the viability analysis is somewhat dishonest and fails to meet the test of 36 § 219.36(d).

Reply - The reference is to a section of an "Advanced Notice of Proposed Rulemaking" which appeared in the Federal Register on February 15, 1991 (56 FR 6508 ff.). It was an advanced notice of a proposal; the language is yet to be presented either as a proposal or as a final rule. Thus, the quoted characteristics of analysis are not specifically required.

However, the FEIS did adequately present the trade-offs and used generally accepted methods in its analysis. See pages 2-57 through 2-71 in the FEIS for a discussion of the comparison (or trade-offs) of the alternatives. The analysis methods used in the viability analysis are presented in Appendix B of the FEIS and in pages 3&4-51 through 3&4-100, and are further discussed in the responses to comments which follow in this letter and the letter from the Sierra Club Legal Defense Fund.

[*R1 cont] The viability rating of the preferred alternative at the 50 year horizon, as documented on table T-5 of the ISC Report at ISC-385, is at best moderate and is likely over optimistic (because much owl habitat will have been cut outside HCAs but not much will have grown back within HCAs).

Reply - The ISC table T5 at page 385 of the ISC Report, indicates that there are specific portions of the range where there is a MODERATE likelihood of sustaining a viable population at year 50. However, the viability rating for the Olympic Peninsula, Oregon Cascades and Klamath Provinces were rated as either HIGH or VERY HIGH, with the knowledge that there are specific areas of

concern within the provinces. The Oregon Coast Range was rated as a MODERATE. The provincial rating for the Washington Cascades was not provided.

The ISC Report recognized the potential problems in the specific areas when the overall ratings were developed. The ISC Report states in reference to table T-5 (page 384):

"In the Areas of Concern, the probability to long-term success may be substantially lower because of their higher risks. Nevertheless, with full implementation of the conservation strategy (table T5), we believe that a high to very high probability of long-term success exists for maintaining population viability for the northern spotted owl through the next 100 years over its current range."

This issue was also addressed in the ISC Report on page 39 where it is stated there is a VERY HIGH likelihood of sustaining a viable population for at least 50 years (Thomas et al. 1990: 39).

Further, the team of experts that formulated and conducted the viability analysis for this environmental impact statement used a revised viability analysis from that used in the ISC Report and rated Alternative B as having a HIGH likelihood of viability. The analysis carried the viability calculations out to 150 years. The interdisciplinary team recognized a decrease in habitat at 50 years for Alternative B. Three factors led to the overall HIGH rating. First, total acres of nesting, roosting, and foraging habitat are expected to increase over current amounts by year 100 so long-term likelihood of persistence is high. Second, the habitat decrease at the 50-year point is temporary and the viability analysis shows an increase in subsequent years. And third, because the Alternative calls for well distributed, large clusters of spotted owls, survival and replacement of owls in reproductive pairs is expected to be high.

Further information on this issue appears in response to the first comment on L-A-35 of the FEIS, which states: "The ISC Strategy was given an overall viability rating of HIGH in both the ISC Report and this EIS with recognition that habitat will decrease in the short term. The ISC Strategy was rated as providing a VERY HIGH probability of sustaining spotted owl populations for at least 50 years (Thomas et al. 1990: 39). The ISC Strategy provides for a pattern and distribution of habitat to minimize risk to the spotted owl.

"The standards and guidelines of the ISC Strategy, such as those for designated areas and dispersal habitat, are designed to provide for a viable population of northern spotted owls. An example of how the ISC Strategy accounts for particular areas is that in areas of concern, Category 1 or 2 HCAs are delineated, and in some areas, Category 3 HCAs are required. The EIS viability analysis for this environmental impact statement recognized that there is an expected loss of habitat at year 50, but after review of the entire Strategy, Alternative B was given an overall viability rating of HIGH."

[*R1 cont] The true viability rating of Alternative B is more likely LOW, in part because other land-owners, such as the BLM, have decided not to implement the ISC strategy, and the ISC rating of Moderate was based on the assumption that BLM would implement the ISC strategy.

Reply - This issue is addressed in the response to the second comment on page L-A-35 of the FEIS which states: "How other land managers manage spotted owl

habitat is important but not within the Forest Service's jurisdiction. In assessing viability it is assumed that other Federal land managers will comply with Section 7(a), and private and other landowners will comply with Section 10, of the Endangered Species Act.

"The northern spotted owl is listed as a Threatened subspecies; the effect of the management direction presented in these alternatives on the viability of the entire subspecies is of concern to the public and the Forest Service. Therefore, the viability analysis in this FEIS assesses the effect of the alternatives (which provide management direction for National Forests lands only) on the long-term viability of the northern spotted owl as a subspecies in the planning area.

"This viability analysis of the subspecies is appropriate because 1) the viability of populations outside the National Forests contribute significantly to a well distributed viable population in the National Forests, 2) the CEQ regulations implementing NEPA Section 102 (40 CFR 1508.25(a)(2), 1508.25(c) and 1508.7) require the analysis and disclosure of consequences outside the immediate site or planning area, and 3) the Endangered Species Act (Section 7(c)(1)) requires a biological assessment to identify the effects of an action on a Threatened, Endangered, or Proposed Species. (The biological assessment may be undertaken, as it was in this case, as part of the environmental impact statement.)

"The U.S. Fish and Wildlife Service, under the authority of Section 7(a) of the Endangered Species Act, is responsible for evaluating whether or not a threatened species is jeopardized by another Federal agency and that its critical habitat is not destroyed or adversely modified. That responsibility is the basis for assessing the effect of the alternatives in this FEIS on the viability of the northern spotted owl.

"This environmental impact statement uses the assumption that other lands will be managed in accordance with Section 7(a) or Section 10 of the Endangered Species Act. Specifically, it is assumed that as a result of consultation with the U.S. Fish and Wildlife Service other Federal agencies will manage their lands with a level and pattern of owl habitat protection necessary to meet the requirements of the Endangered Species Act and comparable to that presented in the ISC Strategy. This assumption is based on the record of consultation and opinions issued by the U.S. Fish and Wildlife Service in the last two years and on compliance by other agencies.

"The other Federal land management agencies have managed their lands in accordance with the opinions of the U.S. Fish and Wildlife Service and in accordance with the Endangered Species Act. It is true that the Bureau of Land Management in Oregon, after receiving "jeopardy opinions" on 44 proposed timber sales, applied for an exemption from the requirements of the Endangered Species Act under the Act's provisions of Section 7(g). The Endangered Species Committee has yet to rule on this application. A decision is expected in the first half of 1992. The Bureau of Land Management has not made any irreversible or irretrievable commitments of resources which would foreclose management of the habitat in accordance with the U.S. Fish and Wildlife Service's recommendations.

"Should the Endangered Species Committee grant an exemption to the Bureau of Land Management and the spotted owl habitat on the lands it manages is adversely modified, this new information would be a cause for reexamining the

effects on the viability of the spotted owl as a subspecies and reexamining the management direction for its habitat on the National Forests.

"Where the management of owl habitat by other managers is especially crucial to the viability of the northern spotted owl, it is identified in the environmental impact statement, along with the consequences should those management assumptions not be met."

[*R1 cont] In addition, the ISC strategy itself is simply too optimistic and probably won't work.

This issue is addressed in the response to the first comment on page L-A-24 of the FEIS. In response to the comment "Some of the assumptions used in the ISC Strategy were too optimistic." the response states: "The Interagency Scientific Committee interpreted the data with recognition to uncertainties and assumptions. Assumptions must be made with any modeling effort. The best available empirical data was reviewed by the committee and uncertainties pertaining to the models were clearly identified in Appendix M of the ISC Report (Thomas et al. 1990). The viability ratings; HIGH, MEDIUM and LOW, account for degrees of uncertainty.

"Further, while quantitative analytical methods were used in the ISC Report, and in this EIS, these were not the only methods used to assess population viability. Professional judgement was relied upon after review of the best available empirical data. Therefore, any potential problems with the modeling effort is expected to be minimal.

"Monitoring, research and the Spotted Owl Recovery Plan, which is expected to be released this year, will provide information to test these assumptions thereby providing information necessary for adaptive management. Additional precautions will be provided by the project level consultation with U.S. Fish and Wildlife Service on actions that affect spotted owls and their habitat."

A strategy which is overly optimistic would not have scientific credibility. This question is addressed in the response to the first comment on page L-A-23 in the FEIS, which states: "The ISC Strategy for the northern spotted owl is scientifically credible for several reasons. First, the scientific method was used to develop the strategy. Strategies were tested and adjusted with the best available quantitative data and other information including modeling. Second, each member of the committee had credentials, experience, and reputations appropriate to the task. Third, published literature, reports and ongoing research was reviewed and considered when developing the strategy. Finally, the report was subject to thorough peer review by professionals selected by the following societies: The Wildlife Society, Society of American Foresters, Society for Conservation Biology, The American Ornithologists' Union, and The Ecological Society of America (USDA Forest Service 1991a, Question #15)."

The second paragraph of the response to the second comment on page L-A-23 of the FEIS also addresses this issue. It states: "In the court transcripts for SAS v Evans, Doaks, Orians, and Kareiva critique the ISC Strategy, particularly the modeling. Modeling was only a part of the ISC Strategy. The ISC utilized the best available information and professional judgement in the development of the ISC Strategy. It is the most scientifically credible plan for management of the northern spotted owl developed to date."

[*R1 cont] The FEIS is thus inadequate because it ignores the short-term risks associated with the ISC strategy and insists on carrying the viability analysis out to 150 years. At 150 years the viability rating is HIGH because the HCAs have developed a lot of new owl habitat characteristics.

Reply - This issue is addressed in the reply to *R1 (second segment) above.

[*R1 cont] In other words, your methodology is not "generally accepted" nor does it "adequately disclose trade-offs" as required by 36 CFR § 219.36(d).

Reply - This is not a current requirement. See the Reply to *R1 (first segment) above.

[*R2] The rational decision-maker would like to know how vulnerable the species is at the most vulnerable stage of the conservation strategy, not at the end of an idealized 150 year scenario. My point is that we need to leave more margins of error in the owl conservation strategy. After all it is the mistakes of our generation that have gotten us here, so it should be our sacrifice not our children's children's. The risk at the 50 year horizon is too high to tolerate, and this risk has not been adequately disclosed to the decision-maker or the public as required by NEPA.

Reply - This issue is addressed in the reply to *R1 (second segment) above.

[*R3] The ISC report itself identifies its objectives to be met within a 50-100 year planning period, not 150 years. FEIS 2-21.

Reply - This issue is addressed in the reply to *R1 (second segment) above.

[*R4] The DEIS comments of the Department of Interior reprinted on FEIS Appendix L-B-6 make this point also. "[I]t is not clear which period of time is used as persistent [ie viable].... It would be nice to know how a reasonably expected range of changes may change the viability rating for each alternative." The 150 year time period chosen to assess population viability was so critical to the outcome of the analysis that it could well have been another "criterion" used to assess viability.

Reply - This issue is addressed in the reply to *R1 (second segment) above.

[*R5] Nowhere in the FEIS discussion of the viability rating for alternative B on FEIS 3&4-96 does it mention the viability of the owl at the 50 year time interval, even though on FEIS 3&4-53 it says: "Because viability is best assessed over multiple generations, periods of 50 years (about five generations) were considered most appropriate."

Reply - This issue is addressed in the reply to *R1 (second segment) above.

[*R6] 2. FEIS 2-31 indicates that salvage is prohibited within HCAs. This no-salvage rule should be absolute, but the FEIS goes on to say that "where salvage over large areas may be proposed, salvage activities must be approved by the interagency body organized to review implementation of the conservation strategy. "Who is this interagency body? FEIS 2-34 says that the interagency [sic] Technical Review Team will "review proposals

referred to them from member agencies to determine consistency with the ISC strategy." FEIS 2-35 says that an interagency [sic] Steering Committee and Oversight Team were established to "evaluate ... activities and projects affecting spotted owl habitat for their consistency with Forest Service Standards and Guidelines for management of Northern Spotted Owl habitat." I'm not sure which of these interagency bodies is the body referred to on FEIS 2-31, which body will decide whether to salvage in the Warner Creek Fire area, for instance.

Reply - The discussion about the Forest Service Steering Committee and Oversight Team on page 2-35 makes no reference about it being "interagency" and in fact it is not. As described, this internal team was established by "Forest Service Deputy Chief James Overbay.....to insure consistent implementation of current and future management direction for northern spotted owl habitat" and to "evaluate proposals for adjustments to the management direction". This team helps line officers across the two Forest Service Regions understand what activities are and are not appropriate within HCAs, for instance, but does not assume the responsibilities assigned by the standards and guidelines to an "Interagency" committee or body. Proposals for adjustments to the standards and guidelines (the ISC strategy) will be forwarded by the Forest Service Oversight Team and Steering Committee to the interagency Technical Review Team, as described in the FEIS on page 2-34, for their consideration and action.

[*R7] The responses to comments in FEIS Appendix L did not clarify the question at all. FEIS Appendix L-A-21 indicates that it is the Technical Review Team which is the "interagency technical body organized to review implementation of the conservation strategy." Then on FEIS Appendix L-A-49, the second response under the heading Forest Health says that the Oversight Team and the Steering Committee must evaluate salvage logging due to special circumstances in HCAs. My question is: who's in charge of approving exceptions to the general prohibition on salvaging in HCAs? As I read the FEIS now, both the Technical Review Team and the Oversight Committee/Steering Committee must find any HCA salvage proposals consistent with the ISC before salvage could take place.

Reply - This is correct; both the interagency Technical Review Team and the Forest Service Oversight Team and Steering Committee must find any HCA salvage proposals consistent with the standards and guidelines before salvage.

[*R7 cont] And since HCAs are "to be managed and conserved" primarily for Spotted Owls, salvage could take place only to accelerate the creation of spotted owl habitat via proven silvicultural techniques, and not for economic reasons nor to "recover the fiber before it loses its commercial value."

Reply - There may be circumstances, for instance, where long term maintenance of owl habitat may require treatments aimed at reducing fire or insect and disease risks. Additionally, the ISC considered the possibility that some "extensive area" might be appropriate for salvage. The interagency Technical Review Team will define "extensive areas" and must approve "salvage of extensive areas", consistent with the objectives of the strategy.

[*R7 cont] Fallen trees have many non-commercial values in the naturally regenerating forest. They provide structural diversity and habitat for the owl's prey species, for instance. FEIS 3&4-14 says that "structural components typical of old-growth forests are sometimes found in young

forests, especially those that have regenerated after fire or other disturbances that have left behind large trees, snags, and logs from the previous stands." Salvage within HCAs such as the Warner Creek Fire Area should not be allowed because it would interfere with the natural process of developing complex owl habitat. Natural regeneration processes are the only proven way to "create" structurally diverse Spotted Owl habitat characteristics.

Reply - The FEIS acknowledges the value of natural stands. Any proposals will be reviewed as indicated above to ensure compliance with the standards and guidelines.

[*R8] 3. Regarding uncertainty, the FEIS says that the central relationships are well understood and any remaining uncertainty is not essential to a reasoned choice among alternatives. The comments in the Appendix to the FEIS indicate that knowledge of the direction of trends is enough to make a reasoned choice. I must protest this logic. Just because you know the direction of trends does not mean that you know the thresholds that control viability or extinction. It is the thresholds that are critical when we are concerned with extinction, not the trends. In other words, you may know that more contiguous habitat would benefit the owl and increase the probability that a viable population could be maintained, but you really don't know how much contiguous old-growth is enough to bring the Spotted Owl back from being threatened with extinction.

Reply - This issue is addressed in the response to the third comment on page L-A-33 of the FEIS which states: "The provision for large designated areas to be within close proximity to each other throughout the range of the owl, coupled with the other provisions in the ISC Strategy, are more important for spotted owls than the absolute amount of habitat. A decline in spotted owl habitat was recognized by the Interagency Scientific Committee and is documented in this EIS. The decline in northern spotted owl nesting, roosting, and foraging habitat due to timber harvest is included in the calculations of potential change in owl habitat over time in the viability analysis, criterion 1. Although the amount of habitat will be less in the short term over all areas and permanently less in the Forest Matrix, both the ISC Report and the analysis in this EIS rate the viability of the northern spotted owl as HIGH in the long term in Alternatives B, C, and D. This HIGH rating is, in part, because the regrowth of habitat will exceed harvest rates under these alternatives."

This issue is also addressed in the response to the fourth comment on page L-A-34 of the FEIS which states: "The absolute value which assures viability or precipitates extinction is unknown. It is not simply an absolute number of owls that could assure viability, the amount and pattern of habitat are primary factors in providing for a viable population.

"Research and monitoring of northern spotted owl populations will provide opportunities to evaluate management, and alter the current direction if needed. Management direction is conservative enough to allow detection of any adverse effects to spotted owls in sufficient time to use the adjustment process to preserve long-term viability."

This concern is also addressed in the response to the first comment on page L-A-34 of the FEIS which states: "Under any alternative spotted owl numbers

will decline in the short term. The ISC Report views the above referenced 50 percent decline as a worst-case scenario that assumes no owls will occur in the Forest Matrix between HCAs. This EIS accounts for owls in the Forest Matrix. An assumption of the ISC Strategy is that the overall number of spotted owl pairs is less important than the distribution of pairs (size of spotted owl clusters and distances between them). The ISC Strategy (Alternative B) results in a reduced population when compared to present levels, but a much more secure population due to size, spacing, and security of habitat. The habitat capability calculations in this EIS estimate a 26 percent decline from current habitat capability levels under Alternative B. The arrangement of habitat in large blocks that are adequately spaced compensates for a smaller population".

This issue is also addressed in the response to the first comment on page L-A-35 of the FEIS which is quoted in response to *R1 (second segment) above.

[*R9] Remember that you are allowing 50% of the owl pairs to perish and you are continuing to cut large amounts of suitable spotted owl habitat outside of HCAs.

Reply - this issue is addressed in reply to *R8.

[*R9 cont] You have a duty to maintain a viable population throughout the range of the owl, yet the Oregon Coast Range and Olympic Peninsula populations are so low and so genetically isolated that they may be doomed. Dr. Noon said so himself recently at the Endangered Species Committee hearings in Portland (Eugene Register-Guard, January 28, 1992).

Reply - The ISC strategy is flexible, providing for a high likelihood of a viable population and allowing the incorporation of new information to modify the strategy if appropriate. Two main issues that are relevant here were addressed at the Endangered Species Committee hearings.

The first issue regards the amount of habitat in the Oregon Coast Range. During direct examination, Noon indicated that less suitable habitat is in HCAs on Bureau of Land Management lands than was assumed by the ISC (Transcripts from the hearings for the Endangered Species Committee for Dr. Noon at number 3753, on file in the administrative record for this EIS). Further, Noon indicated that the HCAs were not functioning as envisioned by the ISC because they may support fewer owls than originally estimated. The lower number reflects more realistic assumptions about the suitable habitat contributed from private lands, and the likely nonlinear relationship between numbers of owls and amount of habitat (Transcripts from the hearings for the Endangered Species Committee for Dr. Noon at numbers 3605 and 3606).

Noon stated that the ISC strategy could accommodate the changes by adding Category 3 HCAs in the vicinity of any Category 1 or 2 HCA that is currently deficient, or by redrawing the boundaries of such an HCA (Transcripts from the hearings for the Endangered Species Committee for Dr. Noon at numbers 3613 and 3755). This can be accommodated through the adaptive management process, therefore there is no need to halt the implementation of the ISC strategy until this information is further reviewed.

Under Alternative B, which adopts the ISC strategy, the Forest Service establishes Category 3 HCAs in the Oregon Coast Range until the target number of pairs is met for the Category 1 HCAs. Thus, the suggestion to establish Category 3 HCAs is in keeping with the current direction for the Forest Service

in the Coast Range. Noon's testimony was specific to the BLM's lands, so the suggestion to redraw their HCA boundaries may not directly affect Forest Service HCAs. If boundaries do need to be adjusted, then this can be done through the adaptive management process.

The second issue involves the updated information on population declines, as discussed by Anderson ("Estimated Rates of Population Change in the Northern Spotted Owl," presented as U.S. Fish and Wildlife exhibit 90, on file as part of the administrative record for the EIS). The issue that populations are declining is consistent with findings of the ISC. The ISC reported that population declines should be expected, in the near-term. The rates of decline presented by Anderson may be greater than those presented in the ISC Report.

An earlier draft of this report was available for and considered in the FEIS (FEIS 3&4-35). The conclusions of the paper presented at the hearings and the earlier draft reviewed in the EIS are the same. After preliminary review of the earlier draft, it was concluded that this information did not represent a significant change in the status and trends for the owl. Declining trends were anticipated in the ISC Report. Because this information does not run counter to the analyses presented in the ISC Strategy, there is no need to change the strategy's standards and guidelines or process of implementation.

Because demographic parameters are crucial in determining status of the owl, this information was referred to the Forest Service Oversight Team on February 11, 1992. This team, in conjunction with appropriate specialists, will further review this information and determine whether any modification of the implementation of the strategy on the National Forests should be recommended to the interagency Technical Review Team. This is the standard process for dealing with new information and is a part of the adaptive management process specified in the EIS.

[*R9 cont] You may know what these populations need more of, but I contend that you don't know how much, when and where they need it to vie as a population. Much larger margins of error (ie more owl habitat) are needed to maintain viable populations of owls. I also contend that there is great uncertainty in this FEIS which affects the ability of the decision-maker to make a reasoned choice among the alternatives, therefore the requirements of 40 CFR s 1502.22 have not been met.

Reply - This issue is addressed in the response to the first comment on page L-A-6 of the FEIS which states: "The existence of scientific uncertainty was disclosed in the section "Incomplete and Unavailable Information" at the beginning of Chapter 3&4. The foreseeable risks are disclosed throughout Chapter 3&4. The foreseeable risks to the viability of the spotted owl were presented in the viability analysis. The foreseeable risks to other aspects of the environment and the uncertainty surrounding estimates of consequences were addressed in narratives disclosing the environmental consequences (see, for example, the discussions and appendices on Fire and Fuels Management, and Insects and Diseases). Elsewhere, the uncertainty of estimates are clear in the language that describes the effects in conditional or approximate language rather than in absolute terms.

"As indicated in the section 'Incomplete and Unavailable Information' the interdisciplinary team examined the incomplete and unavailable information to see, in the language of 40 CFR 1502.22(a), 'If the incomplete information

relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among the alternatives.'

"The team concluded that the missing information was very unlikely to reverse or nullify established relationships, and therefore, not essential to a reasoned choice among the alternatives. (Therefore, the requirements of 40 CFR 1502.22(b) were not applicable, though the elements of that section are present in the environmental impact statement.)

"It is important to review the alternatives in light of the factors they incorporate which minimize the risk to spotted owl habitat and subsequently, the spotted owl.

- "Each alternative moves at a slow pace. For example, with Alternative B, nesting, roosting, and foraging habitat would be reduced under the Forest Plan standards and guidelines by 0.15 percent annually in the first 50 years. The viability outlook at the 50-year mark is one of a very high probability of viability (Thomas et al. 1990: 39). Habitat conditions are projected to improve (Chapter 3&4, "Criterion 1, Potential Change, Alternative B").
- "Each alternative incorporates a monitoring plan and an adjustment process to change management direction should new information indicate that habitat, or the spotted owl, is jeopardized.
- "Management activities in Critical Habitat are the subject of consultation with the U.S. Fish and Wildlife Service in all alternatives.
- "The alternative selected would be reexamined with the release of the Recovery Plan, and the viability analysis would be reconsidered if the assumptions about management on other Federal lands were changed by the action of the Endangered Species Committee.

"Thus, information which is yet to be developed or more fully specified about spotted owls and spotted owl habitat is not essential to a choice now among the alternatives. The implications of the alternatives and their differences are clear in this environmental impact statement; additional unavailable information is not essential to a choice among them."

[*R10] 4. Your analysis of Pacific yew as it relates directly to the viability of the spotted owl is still inadequate. The many functions that yew trees play in the old-growth forest ecosystem are not disclosed. I understand that the imminent [sic] Spotted Owl biologist Eric Forsman recently told Congressman Ron Wyden that there are critical links between the life cycles of the Spotted Owl and the Pacific yew. Forsman thought that these links must be disclosed in the EIS or it may not be an adequate decision-making document.

Reply - Every attempt was made to consider new information including unpublished research findings and credible scientific input. Dr. Forsman was contacted regarding the relationship between Pacific yew and the northern spotted owl, and the results of that contact are noted in the FEIS. (See Appendix I, page I-2.) The proposed action, Alternative B, does not propose to harvest yew nor is expected in any way to increase the harvest of yew. Additionally, the harvest of Pacific yew will be the subject of a different environmental impact statement. Proposals to harvest yew within HCAs will be subject to the HCA standards and guidelines.

[*R10 cont] Since yew trees are slow growing and small when mature, they play are [sic] a stable and important part of the mid-level canopy of many forest areas inhabited by Spotted Owls. Owls are known to perch in yew trees under the canopy of larger trees in order to regulate their body temperature during the hot summer months. Considering the relationships of owls to the yew and the huge increase in demand for the yew, the FEIS should set out specific Standards and Guidelines regarding yew harvest within HCAs. You cannot defer to the ongoing Pacific yew EIS process. They are addressing the yew, not the owl. They are not going to set Standards and Guidelines that protect the owl. Their focus is on the yew supply and conservation of the yew as a species. Your job is to disclose the needs of the Spotted Owl as it relates to habitat components provided by the Pacific yew and to establish Standards and Guidelines to regulate yew harvest in HCAs. This, you have not done.

Reply - This issue is addressed in the response to the last comment on page L-A-55 of the FEIS which states: "The overall management of Pacific yew is outside the scope of this EIS. The alternatives do not affect yew other than to potentially reduce its accessibility. Management of Pacific yew is the subject of a separate EIS now being prepared." If harvest of Pacific yew is proposed within HCAs, the Oversight Team would need to determine that it was consistent with the standards and guidelines or refer the proposal to the Interagency Technical Review Team.

[*R11] Furthermore, your Appendix I on the Pacific yew is inaccurate in many respects:

- 1) The average ten-inch tree yields six to ten pounds of bark not ten to twenty pounds as stated at FEIS Appendix I-1. So over half a million of the Northwest's largest yew trees will be killed over the next 5-6 years if harvest does not shift to the needles soon;

Reply - This issue is addressed in the response to the first comment on page L-A-55 of the FEIS which states: "The data cited is based on the most current information and the discussion describes what is expected to happen under Alternative A. Alternatives E, B, C, and D propose increasing amounts of designated areas managed primarily for spotted owl habitat. This designation could reduce the amount of Pacific yew harvest. The discussion in the EIS permits a comparison of the alternatives and a reasoned choice among them. Currently, an EIS is being prepared for the management of Pacific yew and additional inventory data is being collected."

- [*R12] 2) The FEIS says that Alternative A would provide the most taxol because it allows the most timber harvest. This statement reveals many short-sighted prejudices. Alternative A actually provides the least taxol in the long-run because, by allowing more timber harvest and slash burning, Alternative A would destroy more natural taxol factories (ie living yew trees) than other alternatives. If fewer areas were clear-cut and burned, then more taxol could be collected from the leaves of living yew trees for years to come. Alternative A would provide greater quantities of taxol only in the most short-sighted and belligerent sense;

Reply - If the harvest of yew within HCAs is determined to be detrimental to northern spotted owl habitat (as suggested in comment *R10 above), Alternatives B, C, and D with increasing area managed primarily for owl habitat will reduce the short- and long-term availability of Pacific yew regardless of the

silvicultural system applied. Nevertheless, the EIS recognizes the concern you state, on page I-3: "Alternative A, with the highest level of timber harvest would impact the yew populations the most....." Additionally, although clearcutting now avoids the use of burning where the potential for yew sprouting exists, the demand for wild yew bark is expected to be short term.

[*R13] 3) Your estimate that alternative supplies of taxol will provide 50% of taxol needs by 1995 are unfounded and greatly exaggerated. Synthesis of this complex molecule is simply not feasible in a commercial setting. The medical community has been promising for the last five years that they would be out of the woods in just a few more years. Well a few more years become a few more years and pretty soon the resource is gone before you know it, because you didn't inventory the resource, set a sustained yield ASQ, or prepare an EIS to consider the alternatives and impacts of what you are doing.

Reply - This is addressed in the response to the last comment on page L-A-54 of the FEIS which states: "Due to the current high interest by the National Cancer Institute in Pacific yew, and specifically taxol, a substantial amount of funding is being expended to determine if taxol can be produced synthetically. The National Cancer Institute, as well as the Forest Service, is optimistic that taxol can be produced from alternative sources in a relatively short period of time." In fact, considerable funding is going into several alternate sources of taxol by several companies, including taxol from cuttings, plantations of yew that will be completely utilized within four years, use of needles from ornamental yew, and tissue culture, in addition to synthetics. For example, the Department of Agriculture has entered into a Cooperative Research and Development Agreement with Phyton Catalytic Inc., Ithaca, N.Y. to optimize the cell culture process. A French firm is conducting clinical studies on a taxol-type product obtained from yew needles. The expectation of those involved with taxol, including Bristol-Meyers Squibb, is that alternate sources will meet the taxol needs within the timeframes stated.

Additionally, the response to the last comment on page L-A-55 of the FEIS states: "The overall management of Pacific yew is outside the scope of this EIS. The alternatives do not affect yew other than to potentially reduce its accessibility. Management of Pacific yew is the subject of a separate EIS now being prepared."

Please consider these comments in light of the upcoming ROD.

Sincerely

/s/
Wendell Wood
Oregon Natural Resources Council

RESPONSE TO COMMENTS FROM E. ZAHN

The comment received January 29, 1992 from E. Zahn, addressed to The Supervisor, was a photo-copy of page 3&4-231 from the Errata to the FEIS. The following replication of that page shows E. Zahn's underlines and, in the left margin, Zahn's comments.

Adverse and Long-Term Consequences of the Proposal

Please-man is the worst predator - overpopulating people cause environmental abuse

The Council on Environmental Quality regulations require that this discussion include "any adverse impacts which cannot be avoided should the proposal be implemented, the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources which would be involved in the proposal should it be implemented" (40 CFR 1502.16). The proposal is Alternative B.

Adverse Consequences

Welfare really - in another form after years of clearcutting monoculture

The adverse consequences which could not be avoided if Alternative B was implemented have been presented in the earlier parts of this chapter. They include the loss of spotted owl nesting, roosting, and foraging habitat; the loss of some old-growth stands; the loss of jobs and income; and the threat to the economic vitality of timber-dependent communities.

Short-Term Uses and Long-Term Productivity

Please No commitments for monoculture-timber

The use of natural resources for long-term sustained yield is at the basis of National Forest management and direction. The uses of resources under the standards and guidelines of Alternative B, the Forest Plans, and Regional Guide direction will result in no long-term loss in productivity of forest soils and other components necessary for a healthy forest environment.

Irreversible or Irretrievable Commitments

please - tree growth-for timber is a small value-not people growth -ecosystem value! Your years of permitting over-populating people to cause environmental abuse should end. No excuses.

If Alternative B is implemented, some spotted owl nesting, roosting, and foraging habitat in areas harvested, or damaged by preventable natural events, will be lost for the period of time needed for it to grow again--a commitment of over a century. Likewise, land committed primarily to management for spotted owl habitat is not providing tree growth at the rate it would were stands harvested and regenerated; this loss of growth is not retrievable. Some timber-dependent communities and enterprises impacted by management under Alternative B are not likely to revive.

It is important to emphasize that no natural resources will be irreversibly or irretrievably modified or destroyed before completion of the environmental analysis, decision, and

consultation processes specified in the second paragraph of page 2-35.

Reply - This comment does not lend itself to a specific response.

RESPONSE TO COMMENTS FROM KERRY HASLLIGAN

The following indented text is a verbatim representation of the letter received February 12, 1992 from Kerry Haslligan addressed to Spotted Owl EIS Team.

Spotted Owl EIS Team
USDA Forest Service
P.O. Box 3623
Portland, Oregon 97208

To whom it may concern,

After having read the summary of the EIS for the management of the Northern Spotted Owl, I find none of these alternatives acceptable. I recommend that the policies of the Native Forest Protection Act be used as a guideline for the management of Forest Service Lands. What is needed is an immediate halt to all logging and roadbuilding on Forest Service lands. These lands are publicly own, and should be used for public use, not the exploitation of the timber industry.

It is true that those involved in the timber industry will suffer from this, yet this inevitable. The timber industry's practices are not sustainable, and only 4% of native forests remain uncut. Many industries and cities have come and gone in the past. The days of clearcuts and destruction of our national forests is over.

Upon inspection of the suggested alternatives, I find that alternative D comes the closest to an acceptable plan. It makes the best attempt to support the Interagency Scientific Committee's Conservation Stratigy and uphold the Endangered Species Act.

While being the best of the Alternatives discussed in the EIS, Alternative D does not adress creating sustainable forestry practices, education and retraining of displaced workers, banning raw log exports, creating a value added timber industry, banning clearcutting as method of tree harvesting, promoting ecologically responsible harvesting methods.

The EIS itself states that the Port-Orford-cedar, pacific yew, threatened, endangered and porpesed species, wildlife species, water quality, fisheries soils, cultural resources, and American Indian religious sites will all benefit the most under alternatives with the most land designated as spotted owl habitat. For this reason alternative D is the best of those listed in the EIS, yet it falls far short of the best plan.

I urge you to:

ACCEPT NO MANAGEMENT PLAN MORE LENIANT THAN ALTERNATIVE D, YET HOPEFULLY MUCH STRONGER IN PROTECTION OF OWL HABITAT
UPHOLD THE ENDANGERED SPECIES ACT
PROTECT OUR ANCIENT AND NATIVE FORESTS FOREVER
END ALL LOGGING ON FOREST SERVICE LANDS

DO NOT COMPROMISE OUR FORESTS FOR A DYING TIMBER INDUSTRY

In solidarity with Mother Earth
Kerry Haslligan

Bellingham, WA 98225

Reply - This comment does not lend itself to a specific response.

RESPONSE TO COMMENTS FROM MRS. ROBERT L. FORBES

The following indented text is a verbatim representation of the letter received February 18, 1992 from Mrs. Robert L. Forbes addressed to Spotted Owl EIS Team.

2-10-92

RE: EIS Spotted Owl

It's unbelievable that U.S. Fish & Wildlife, whose Endangered Species data has been proven suspect, has the basic control in changing forest lands that belong to we, the people. Their abrasive relationship with the U.S. Forest Service, who they consider a competitor instead of an ally, compounds the error in cooperating with their intent to devastate the economy and people's lives.

Why is it permissible to set aside productive lands for possible future use of wildlife that isn't presently inhabited by a specie that hasn't been completely substantiated as endangered.

Fish & Wildlife is a bureaucracy trying to gain total control of forest management and convert our forests into a wilderness for easier authoritative management, while ruthlessly destroying entire communities.

Mrs. Robert L. Forbes
Meadow Valley CA 95956

Reply - This comment does not lend itself to a specific response.

RESPONSE TO COMMENTS FROM JEFF KREPPS

The following indented text is a verbatim representation of the letter received February 18, 1992 from Jeff Krepps addressed to Jerald N. Hutchins.

Jeff Krepps
Villanova, PA 19085

Spotted Owl EIS Team:

Once again I would urge implementation of ALTERNATIVE B. It seems to at least attempt to reach a midpoint even though must admit it does lean toward the environment (is that so bad). We must realize this is the only environment we have and we mustn't allow George Bush's failed economic policies force us to destroy what little flora and fauna we have left. Alternative E is one of the most bogus arguments for anything I have heard all year. I assume it was proposed by the timber industry.

Could I also obtain copies of the complete impact statement and the final record of decision when it is released.

Sincerley concerned for the environment,
Jeff Krepps
/s/

Reply - This comment does not lend itself to a specific response. A copy of the FEIS was mailed to Mr. Krepps.

RESPONSE TO COMMENTS RECEIVED FROM HARRY P. HOSEY

The following indented text is a verbatim representation of the letter received February 19, 1992 from Harry P. Hosey of Early Winters Resort addressed to F. Dale Robertson.

February 11, 1992

Mr. Dale Robertson
Chief, United States Forest Service
14th and Independence Avenue S.W.
Washington, D.C. 20090-6090

Dear Mr. Robertson:

[*E1] Thank you for finding time in your intense schedule to meet with the representatives of the Early Winters Project last Friday, February 7. It was apparent to us that you are well informed on the issues and the seriousness of identifying the Early Winters Project with an HCA. We appreciated your attention, observations and commitment to review our concerns immediately.

Reply - This comment does not lend itself to a specific response.

[*E2] Early Winters Resort submitted formal written comments on the U.S.F.S.'s Draft Environmental Impact Statement on Management For The Northern Spotted Owl In National Forests (Draft EIS) on December 26, 1991 (copy attached). In the Final EIS the Forest Service did not address our two most significant comments.

Reply - The FEIS did respond to the comments received from the Early Winters Resort. It was made clear in the EIS that this was a programmatic EIS, and that specific projects would have to be addressed on a case by case basis and not as a part of this document.

Even though it is a project level issue, the EIS specifically addressed the concerns in the Early Winters letter. The responses to the second comment on page L-A-75 and the second comment on page L-A-71 in Appendix L refer to the table and text on page 3&4 - 166 in the FEIS. The impact on the Early Winters Resort is noted, along with the possibility of boundary adjustments.

The ski area was also specifically addressed in the first comment and response on page L-A-40 of the FEIS which stated: Comment: Early Winters Ski Area does not require HCA protection since timber will be removed only in accordance with approved comprehensive planning process. Response: The need for a Category 3 HCA was established by the ISC Strategy because of the reported presence of northern spotted owls at that site. Any habitat modification will be guided by the standards and guidelines of the selected alternative. Adaptive management proposals for habitat modification are subject to review and approval as presented in Chapter 2."

In response to a comment regarding activities permitted in HCAs, the first response on page L-A-22 includes reference to ski areas and the need to evaluate them on a case-by-case basis. "Most activities that do not adversely impact spotted owl habitat are permitted. These include greenery, fern, and

mushroom gathering, berry picking, and cone harvesting. Activities such as small hydroelectric projects, campground and trail construction, ski resorts, and rock pit expansions may or may not adversely affect spotted owl habitat, and must be evaluated on a case-by-case basis (Thomas 1991, Question 6). Activities specifically prohibited are identified in the standards and guidelines for Alternatives B, C, and D in the FEIS. Activities not specifically addressed will be evaluated by the Oversight Team for their consistency with the selected alternative."

The general topic of the scope of this environmental impact statement was also emphasized in the "Introduction" on page L-A-12, which noted in part: "Requests to consider site-specific modifications or special sub-regional management strategies are too limited in scope for inclusion in this programmatic environmental impact statement."

[*E2 cont] One, the lack of scientific data justifying designation of an HCA at Early Winters

Reply - As indicated above, the examination of site- and HCA-specific adjustments and changes are outside the scope of this EIS. The implementation and adjustment processes are the appropriate mechanism for this issue.

The first comment and response on page L-A-17 noted the comment of the Early Winters Resort (the only commenter to submit field sighting notes) and reported: Comment: Reviewers submitted maps and text, submitted field sighting notes, and named specific drainages, to advocate alternatives with changed boundaries for HCAs and CHUs or to request the deletion or addition of HCAs from the alternatives. Response: Site-specific changes to specific units and unit and area boundaries are too detailed for this environmental impact statement. Such changes more properly should be referred to the Oversight Team which will evaluate and may recommend changes in boundaries and standards and guidelines to the Steering Committee. See the discussion in Chapter 2--"Implementation of Alternatives B, C, or D".

[*E2 cont] and second the preexisting contract right which should have precluded Early Winters from ever being considered for an HCA.

Reply - The non-compensable permit must comply with regulations of the Department of Agriculture, and be consistent with the Forest Plan. The regulations at 36 CFR 219 require the maintenance of the viability of fish and wildlife species; the HCA contributes to that requirement. The standards and guidelines for HCAs constrain many pre-existing uses and plans across seventeen National Forests. As indicated above, this EIS can not consider site-specific adjustments to specific areas; the implementation and adjustment processes presented in the FEIS, along with site-specific environmental analysis are appropriate avenues for those adjustments.

[*E2 cont] It is our understanding that the Forest Service still may respond to these comments or make appropriate adjustments to the Final EIS and incorporate the changes in the Record of Decision, currently scheduled to be issued no sooner than March 2, 1992. We therefore request that the Forest Service review the lack of evidence and the inappropriateness of designating of the Early Winters site in an HCA, and

we request that the results of this review be incorporated into the Record of Decision.

Reply - An adjustment of this type to the FEIS would require a Supplement to be published for public review and comment. However, the FEIS makes provision for adjustments of this type through the implementation and adjustment process presented on pages 2-33 through 2-35 of the FEIS.

[*E3] We also request that the Forest immediately proceed to finalize and publish the Draft Supplement Environmental Impact Statement (SEIS) for the Early Winters Resort project. The SEIS should defer any discussion of the designation of Sandy Butte within an HCA to the Record of Decision associated with the Final EIS.

Reply - This request is to a separate proposed action and different environmental impact statement.

[*E4] We appreciate your immediate attention to this issue. Congress, the State of Washington, Okanogan County as well as Early Winters Resort have a huge financial investment exceeding \$20 million dollars in this project. Our ability to proceed will result in more than 1500 jobs in Washington's most depressed county, \$150 million of construction during the next three years, at least \$50 million construction dollars per year thereafter for 10 to 15 years and net tax dollars to the state and country exceeding \$10 million per year. If the Early Winters Resort is constructed it will be the premiere destination resort in the state and a most important component in the state's tourism industry.

Reply - These economic effects are more properly analyzed and disclosed in the Draft Supplemental EIS on the Early Winters Resort project.

Sincerely,

Early Winters Resort

/s/
Harry P. Hosey
President

RESPONSE TO COMMENTS RECEIVED FROM MICHAEL A. CELAYETA

The following indented text is a verbatim representation of the letter received February 21, 1992 from Michael A. Celayeta addressed to the Spotted Owl EIS Team.

Spotted Owl EIS Team
USDA Forest Service
P.O. Box 3623
Portland, Oregon 97208

This is a request for a clarification of a Forest Service response regarding a question addressed in FEIS.

Volume 2, Appendix L, Page L-A-53

Comment: How will the 42 percent reduction in old-growth harvest of the third, fourth, and fifth decades be compensated for to insure an ASQ comparable to the first and second decades? The FEIS needs to disclose the nature of the types and amount of stands which would contribute to the ASQ for the third, fourth and fifth decades.

Response: The old-growth figures in this environmental impact statement are for "existing" old-growth forests only, and do not consider ingrowth. Harvest schedules in later decades rely on other, currently younger, stands and eventually on plantations; harvesting each as it matures. This scheduling, which includes only "suitable" timberlands, results in a calculated ASQ that can be maintained in perpetuity. This subject is discussed in more detail in Appendix B of the EIS.

Volume 2, Appendix B, Page B-6

Part 2: ANALYTIC MODEL USED FOR DETERMINING HARVEST VOLUME

Today, if all the older stands remaining in areas managed at least partly for timber production became unavailable for harvest, the ASQ would drop toward zero for two or three decades or more, until harvest could begin to take place in the regenerated stands created for the past 40 to 50 years. Even then, ASQ would still be significantly lower if only because of the reduced acreage available to the harvest schedule.

Reply - all of the above are quotations from the FEIS.

As stated in the above paragraphs, from the FEIS, the 42% reduction in old-growth harvest will be compensated for by (1) ingrowth to "existing" old-growth and (2) harvest of currently younger stands.

Reply - Although it is unclear where the commenter draws his "42%" figure from (see below), it is correct that as the harvest rate in old-growth declines over time (because it gets harvested), the harvest shifts to stands that are currently younger.

However, as stated in Appendix B, the ASQ would drop toward zero for two or three decades or more... Even then, the ASQ would be significantly lower...

Reply - The ASQ would drop toward zero only, as stated in the above quote, "if all of the older stands remaining in areas managed at least partly for timber production became unavailable for harvest" (emphasis added). None of the alternatives in the EIS eliminate harvesting on "all older stands", however. The example in Appendix B simply shows the extreme example to illustrate how important the existing stands are to the ASQ. This effect is demonstrated in part by the decline in ASQ between Alternative A and B. Between these two alternatives, the number of suitable acres available for timber production is reduced only 26%, but ASQ is reduced 43%.

At the beginning of the third decade there is a 42% reduction in ASQ from old-growth forest. This reduction in ASQ from old-growth will not be compensated for by ingrowth or harvest of younger stands according to Appendix B of the FEIS. This will result in another substantial depression in the economies of those communities which are timber dependent.

Reply - It is unclear where the commenter draws his "42%" figure from. We see that the acreage of existing old-growth harvested per decade is around 42% lower for decades 3, 4, and 5 than for decades 1 and 2, and this seems to be the source of the figure, although the 42% figure itself is not used in the EIS. The acres of existing old-growth harvested in the first two decades under alternative B is expected to be 43% of that portion of the old-growth available for harvest, or the portion located on suitable timberlands. Of course that rate will decline over time because, as stated in the above quoted response, as the old-growth is harvested and other trees grow over time, a larger and larger percentage of the harvest moves to those stands. Nowhere do we show a "42% reduction in ASQ from old-growth forests." As stated in the response to the first comment on page L-A-53, "The analysis does not predict the "old-growth" portion of the ASQ."

Further, the term "older stands" is used in Appendix B to distinguish from "younger" stands, or plantations and other young stands that have not reached harvestable size, and as such is more inclusive than "old-growth", although this point only contributes partially to the commenters point.

For the acres removed from the suitable timber base, ASQ is decreased. That is the origin of the ASQ decline between alternatives. But Appendix B does not say that "reduction in ASQ...will not be compensated for by...harvest of youger stands" unless all such stands are removed from the suitable timber base, which they are not.

It appears that the alternatives in the FEIS may not comply with the Forest Service policy which stipulates that trees will not be harvested at a rate higher than can be sustained over time.

Reply - As noted in the response to the last comment on page L-A-52, "Forest Service harvests are limited by policy to levels that can be sustained over time." Page B-4 notes that ASQs for Alternative A "are the same as in...Forest Plans with very minor exceptions" and that all other alternatives "maintain the same objective function as in the final Forest Plan". Chapter 3&4-104 states: "The harvest schedule....must maintain harvest levels without decline on the long term." Reductions in acreages of old-growth and other older stands because of lands being assigned to Habitat Conservation Areas (HCAs) is done before ASQ calculations for the various alternatives is done, and, as described on 3&4-104 and using only those acres remaining available for harvest, "The harvest schedule must optimize harvest dates relative to culmination of stand growth (or some other objective), meet or optimize all other resource constraints or objectives, and maintain harvest levels without decline on the long term." The alternatives all comply with the policy which stipulates that trees will not be harvested at a rate higher than can be sustained over time.

Sincerely,

Michael A. Celayeta
Happy Camp, Ca. 96039

RESPONSE TO COMMENTS FROM ANDREA DAVIS

The following indented text is a verbatim representation of the letter received February 25, 1992 from Andrea Davis addressed to Spotted Owl EIS Team.

February 22, 1992

To Whom It May Concern:

I wanted to let you know that I wholeheartedly support Alternative D for the management of the Northern spotted owl in the national forests.

I support this alternative because the size of habitat under Alternative D would be large enough to withstand some catastrophic loss of forests (summary, p. 21). I believe as much habitat as possible needs to be conserved to ensure that the spotted owl and indeed the old-growth/ancient forest ecosystem of which it is an indicator species, will be available as a priceless legacy for future generations of humans and other species.

Andrea Davis
Portland, OR 97214

Reply - This comment does not lend itself to a specific response.

RESPONSE TO COMMENTS FROM KATHY BRASHERS

The following indented text is a verbatim representation of the letter received February 28, 1992 from Kathy Brashers addressed to Spotted Owl EIS Team.

Feb. 27, 1992

Well...

I'm sitting at the table, sipping on my morning cup of coffee. At 5:00 AM I took my husband to meet the "crummy" at the Bridge of the Gods. He is a log truck driver. My four children are still sleeping.

It is now 6:00 AM and I have just started reading your
SUMMARY

Final Environmental Impact Statement on Management for the
Northern Spotted Owl in National Forests

I flipped to your map on page 4 and felt an awful bone-deep dread. The western half of my state of Washington is gray. Must we let it all grow old and die the natural way? I thought trees were a natural resource - not a national treasure. Aren't we as humans allowed to use the land wisely? Why must we be herded to the cities?

This whole concept propted by radical preservationist is chilling. "They are demanding that "they" dictate forest management. "They" are an insidious bunch. Their demands are getting more outrageous. "They" are now telling private land owners who have second growth trees, that those trees are off limits. Hey - PEOPLE planted those trees! They are a CROP. Yet they are in the gray area on your map. Watch out every state in this union - someone will color yours gray because of some fish or bird or bug.

What is happening? Our country is strong because of fertile land and vigorous individuals. Loggers, miners, farmers... folks who got their hands grubby building this country are now somehow EVIL because they don't sit in clean boardrooms and pass judgement on others. Oh, I am disgusted with the hypocrisy of it all. Where do you think you got the paper on which to write your report?

My little baby is awake. I have to go feed her... while I still can. Thanks for caring about families. What kind of future can my children plan for?

Kathy Brashers
No. Bonneville, WA

Reply - The map to which the writer refers is the range map for the species and does not represent any of the areas to be managed primarily for owl habitat in any of the alternatives. Otherwise this comment does not lend itself to a specific response.

RESPONSE TO COMMENTS RECEIVED FROM SIERRA CLUB LEGAL DEFENSE FUND

The following indented text is a verbatim representation of the letter of February 27, 1992 from Todd D. True addressed to Spotted Owl EIS Team and received February 28, 1992

FEBRUARY 27, 1992

Spotted Owl EIS Team
USDA Forest Service
P.O. Box 3623
333 First Avenue
Portland, Oregon 97208

Secretary Edward Madigan
Department of Agriculture
14th St. and Independence Ave., SW
Washington, DC 20250

Re: Final Environmental Impact Statement on Management for the Northern Spotted Owl in the National Forests

Dear Sirs:

Enclosed please find comments submitted on behalf of Seattle Audubon Society, et al. in regard to the Final Environmental Impact Statement on Management for the Northern Spotted Owl in the National Forests and the Declaration of Dr. Peter Kareiva in support thereof.

Sincerely,

/s/
Todd D. True

VICTOR M. SHER
TODD D. TRUE
Sierra Club Legal Defense Fund, Inc.
705 Second Avenue, Suite 203
Seattle, WA 98104-1711
(206) 343-7340

BEFORE THE SECRETARY

DEPARTMENT OF AGRICULTURE

IN RE FINAL ENVIRONMENTAL IMPACT)
STATEMENT ON MANAGEMENT FOR THE) COMMENTS ON FEIS BY
NORTHERN SPOTTED OWL IN THE) SAS, ET AL.
NATIONAL FORESTS)
)

INTRODUCTION

[*X1] These comments on the Final Environmental Impact Statement on Management for the Northern Spotted Owl in the National Forests ("DEIS") are made on behalf of Seattle Audubon Society, Washington Environmental Council, Washington Native Plant Society, Pilchuck Audubon Society, National Audubon Society, Portland Audubon Society, Lane County Audubon Society, Oregon Natural Resources Council, Siuslaw Task Force, and The Wilderness Society (collectively "SAS").¹ In summary, the FEIS, like the DEIS that preceded it, does not reflect any serious attempt by the Forest Service to comply with the National Environmental Policy Act's ("NEPA") requirements and goals nor does the preferred alternative assure the northern spotted owl's continued viability, as required by the National Forest Management Act ("NFMA").

Reply - Other than to note that the EIS does comply with the requirements of NEPA and NFMA, this comment does not lend itself to a specific response.

[*X2] Due to the similarity between the DEIS and FEIS, we will not repeat our comments made on the DEIS, but attach them hereto and incorporate them by reference. The FEIS has not responded in any meaningful way to these comments. The additional comments filed herein will focus on defects in the FEIS and serve as the transmittal letter for the Declaration of Dr. Peter Kareiva.

Reply - The FEIS did respond in a meaningful way to the comments made by the Sierra Club Legal Defense Fund on the DEIS. Their comments formed the basis for changes between the DEIS and FEIS and a number of comments and responses presented in Appendix L of the FEIS. The Sierra Club Legal Defense Fund's entire comments on the DEIS, with specific responses, are part of Appendix B of the ROD ("Responses to Plaintiff and Intervenor Comments on the Draft EIS"). Therefore they are not duplicated in this Appendix to the ROD, but are incorporated by reference. The Sierra Club Legal Defense Fund's comments specific to the FEIS appear here, with responses; footnotes (and responses) appear at the end of their comments.

The Declaration of Dr. Peter Kareiva, and responses to it, follow the comments of and responses to the Sierra Club Legal Defense Fund's comments specific to the FEIS.

A. Forest Plans Must Be Consistent With New Regional Management Standards.

The FEIS proposes that, if Alternatives B, C, or D are selected, the Forest Service will not conform the Forest Plans for the 17 "spotted owl" forests to the new regional spotted owl standards and guidelines. See FEIS at 2-35.

Reply - There is no language on page 2-35 or elsewhere in the FEIS that can be construed as "the Forest Service will not conform the Forest Plans . . . to the new regional standards and guidelines."

To the exact contrary, the text of the FEIS at page 2-36 states: "In Oregon and Washington--On National Forests with lands within the spotted owl's range in Oregon and Washington, the Forest Plans will be amended by the Record of Decision for this environmental impact statement with the standards and guidelines presented in the selected alternative." (emphasis added) And on page 2-37 of the FEIS: "In California--On National Forests with lands within the spotted owl's range in California, until Forest Plans are completed, the standards and guidelines in the selected alternative will directly apply to projects in designated areas managed primarily for spotted owl habitat described in the selected alternative, and in lands suitable for timber production. The standards and guidelines and the designated areas managed primarily for spotted owl habitat in the selected alternative will be incorporated into the Forest Plans which are being developed." (emphasis added)

[*X3 cont] The FEIS's proposal violates the agency's planning regulations.

Reply - The FEIS's proposal does not violate the agency's planning regulations.

[*X3 cont] Those regulations require that regional guides establish "regional management standards and guidelines necessary to address major issues and management concerns . . ." 36 C.F.R. 219.9(a)(4). The ROD to be issued will establish the regional standards and guidelines for the management of the northern spotted owl.²

Reply - This is correct. The EIS and ROD amend existing Regional Guides in order to revise the management standards and guidelines necessary to address major issues and management concerns pertaining to ensuring the viability of the northern spotted owl.

[*X4] Though the regulations permit a forest plan to become effective prior to the approval of its regional guide (see 36 C.F.R. 219.29(c)), as the Pacific Northwest Region forest plans have, the plans must nonetheless be "amended to comply with regional management direction," upon the direction's issuance. Id. In addition, "if such an amendment is significant, it shall be accomplished pursuant to the requirements for the development of a forest plan" as described in the regulations. Id.

Reply - The regulations at 36 CFR 219.29 apply to the "Transition period" which is defined as the period of time "Until a forest planning area of the National Forest System is managed under a forest plan developed pursuant to this subpart and approved by the Regional Forester. . ." (36 CFR 219.29(a)). The National Forests in the Pacific Northwest Region are all being managed under such plans. Both the Pacific Northwest Region and Pacific Southwest Region have approved Regional Guides.

There are no forest plans in the range of the northern spotted owl which fit the situation described in 36 CFR 219.29(c).

[*X5] Obviously, the adoption of regional standards and guidelines for the management of millions of acres for the northern spotted owl is a significant change in the management of these forests. Thus, the Forest Service must immediately initiate revisions of the approved "spotted owl" forest plans, including recalculation of the allowable sale quantity ("ASQ") (see 36 C.F.R. 219.16)⁴ and reidentification of the land suitable for timber production (see 36 C.F.R. 219.14).

Reply - Because of the immediate need to establish a uniform management strategy throughout the range of the northern spotted owl the ROD amends the Regional Guides and Forest Plans for the management of northern spotted owl habitat. Though Forest Plans are not yet amended to change the suitable land base and the allowable sale quantity of timber, the area available for timber production is limited by these amendments. This is pointed out on page 2-36 of the FEIS: "The annual quantity of timber offered for sale will reflect the harvest implications of the standards and guidelines and the designated areas of the alternative selected." Each National Forest must analyze its own management situation and effects of implementing these management requirements for the spotted owl, provide for public involvement, and conduct an interdisciplinary environmental analysis of all Forest resources to determine the need, timing, and content of Forest Plan revisions or amendments.

[*X6] In summary, the FEIS' proposal that the only action necessary to implement the FEIS and ROD is to conform on-the-ground projects with the new standards and guidelines is simply wrong. FEIS at 2-35.

Reply - The FEIS is clear in the statements of its Underlying Purpose to amend Regional Guides and Forest Plans (page 1-1), its implementation through the amendment of Regional Guides and Forest Plans, (pages 2-36 and 2-37), the conformance of projects to the standards and guidelines (pages 2-36 and 2-37), the incorporation of the direction into forest plans being completed (page 2-37), and the amendment and revision of forest plans (page 2-36). These are all actions specified in the FEIS to implement the alternative selected by the ROD.

[*X6 cont] Nor can the Forest Service defer its NFMA responsibilities pending completion of some other agency's plan, such as the Fish and Wildlife Service's recovery plan. Seattle Audubon Society v. Evans, C89-160WD (W.D. Wa., Order of March 7, 1991) ("SAS"). The forest plans, which are based on the defunct SOHA plan, must be revised to incorporate the new standards set forth by the FEIS and ROD.

Reply - The forest plans are based on significantly more direction than in the 1988 SEIS and ROD. They are based on the Regional Guide for their respective Region which contains direction for all forest resources (not just the spotted owl), Forest Service directives (Manual and Handbook direction) implementing NFMA, and the Resources Planning Act (RPA) policies, goals, and objectives.

The forest plans will be (as noted on page 2-36, and in response to comment *X3 above) amended by the ROD to incorporate the new standards and guidelines set forth in the selected alternative and the ROD.

The Forest Service need not defer initiation of the forest plan revision or amendment process until the issuance of the Recovery Plan. The regulations at 36 CFR 219.10(g) note that a forest plan "may be revised whenever the Forest Supervisor determines that conditions or demands in the area covered by the plan have changed significantly." The discussion of the Recovery Plan and Forest Plan revision is to make note of the obvious importance of the Recovery Plan to Forest Plans and the need to reexamine the adequacy of management direction for spotted owl habitat at that time.

- [*X7] B. The NFMA's Regulations Require the Forest Service to Adopt Measures to Protect Critical Habitat From Destruction or Adverse Modification.

The NFMA's regulations require the Forest Service to develop forest plans that, inter alia, prescribe measures to prevent the destruction or adverse modification of critical habitat. 36 C.F.R. 219.19(a)(7) and 219.27(a)(8). This, like the duty to assure viable populations of native vertebrates, is independent of the agency's concurrent and complementary responsibilities under § 7 of the Endangered Species Act ("ESA").

Reply - The standards and guidelines of this EIS's selected alternative prevent the destruction or adverse modification of Critical Habitat. Habitat is protected by the standards and guidelines for HCAs, the "50-11-40 rule" for lands suitable for timber production outside HCAs, and the maintenance of reserved lands and lands unsuited for timber production lands.

Critical Habitat for threatened and endangered species is determined by the U. S. Fish and Wildlife Service; to date that agency has not identified appropriate management activities for Critical Habitat for the northern spotted owl. The U. S. Fish and Wildlife Service predicts some level of timber harvest in Critical Habitat Units outside the HCAs. Thus it is appropriate to consult with the U. S. Fish and Wildlife Service on specific actions when they are proposed in Critical Habitat Units. Such proposed actions will first have to be consistent with the Forest Service measures identified in the selected alternative.

The FEIS states clearly on page 2-3: "Regardless of which alternative is selected in the Record of Decision, the Forest Service will prevent the adverse destruction or modification (sic) of Critical Habitat (36 CFR 219.19(a)(7)). The appropriateness of a proposed action in Critical Habitat will be determined through consultation with the U. S. Fish and Wildlife Service according to Section 7(a) of the Endangered Species Act".

[*X8] The clear intent of the NFMA regulations is to assure that the forest plans "include coordination" of the various resources of the national forests. 16 U.S.C. 1604(3)(l). Deferring decisions regarding how critical habitat for threatened and endangered wildlife is to be protected to some other agency or at some later time (than the preparation of forest plans) would frustrate Congress' goal of insuring that all of the resources be managed in complement.

Reply - As is indicated in the response to *X7 above, this EIS and ROD do prescribe measures to prevent the destruction or adverse modification of critical habitat for the northern spotted owl.

[*X9] In spite of this clear directive that the Forest Service itself prescribe measures to protect critical habitat and, thus, that the Forest Service (and not some other agency) take responsibility for managing the lands under its jurisdiction, the FEIS preferred alternative fails to prescribe any concrete measures to protect critical habitat. In lieu of carrying out its NFMA duties, the Forest Service apparently believes that consultation under the ESA will, somehow, satisfy its NFMA responsibilities. FEIS at 3&4-52. The Forest Service is as wrong now as it was when the court in the SAS case rejected the same argument in regard to the agency's failure to promulgate standards for preserving the spotted owl's viability.

Reply - As indicated in response to *X7 above, the Forest Service is, with its preferred alternative, prescribing measures to protect Critical Habitat. Since the Fish and Wildlife Service has determined an area larger than the HCAs as Critical Habitat (but has not indicated management prescriptions for these areas) the Forest Service will consult with the U.S. Fish and Wildlife Service on proposed actions in Critical Habitat.

[*X10] The only alternative in the FEIS that prescribes measures to protect critical habitat is Alternative C, which proposes that critical habitat be managed by the same prescription that applies to the Habitat Conservation Areas. In adopting a final plan, the ROD must prescribe measures that will define the types of activities and the manner in which those activities may be conducted in critical habitat in order to satisfy NFMA's independent obligation to protect critical habitat. The FEIS's preferred alternative fails entirely to do so.

Reply - In the absence of specific management direction for Critical Habitat from the U. S. Fish and Wildlife Service, and in keeping with the Fish and Wildlife's Service's own prediction of some level of timber harvest in Critical Habitat Units, Alternative C would provide more protection than is needed. As displayed in the responses to *X7, *X8, and *X9 above, the Forest Service has, with Alternatives B, C, and D in this EIS, prescribed measures that will define the types of activities and the manner in which those activities may be conducted in Critical Habitat. The Forest Service will consult with the Fish and Wildlife Service on proposed actions in Critical Habitat to assure that Forest Service measures are sufficient to prevent the destruction or adverse modification of Critical Habitat.

[*X11] C. The Forest Service Fails to Reveal Critical Information in the FEIS.

In addition to lacking any viability analysis of the owl's population, as detailed in Dr. Kareiva's statement, other critical information is missing from the FEIS. The FEIS relies upon the "professional judgment" of unnamed individuals:

A panel of spotted owl scientists and experts was convened to discuss and evaluate viability criteria under each alternative. The overall rating for each alternative combined quantitative analysis with the panel's collective professional judgment and specific scientific knowledge of spotted owl population dynamics and habitat conditions.

FEIS at 3&4-94. Yet, there is no way for the public or other scientists to evaluate the weight these opinions should be granted without knowing the identity and qualifications of the individuals, or even what their opinions were. The Forest Service simply cannot rationally rely upon unattributed, undisclosed summaries of views as justification for deciding how to manage millions of acres of the public's lands.

Reply - The notes from the viability analysis meeting for the FEIS are a part of the administrative record. The list of participants is included in the meeting notes, and are listed in this response. The credentials of the participants are included in the FEIS, List of Preparers. The meeting notes are available upon request; however no requests for the meeting notes for the viability assessment conducted for the FEIS have been received from the Sierra Club Legal Defense Fund.

Participants at the viability analysis meeting for the FEIS held on December 11, 1991 were: Kim Mellen, Kathy O'Halloran, Dr. Martin Raphael, Dr. Bruce Marcot, Grant Gunderson, Dr. Jack Ward Thomas, Dr. Eric Forsman, Robin Bown, and Dr. Charles Meslow. Marilyn Stoll recorded the proceedings. Jerald Hutchins attended but did not participate in the ratings.

However, the numerical and other basis for the viability ratings are displayed in the FEIS, and as such, stand alone in supporting the ratings presented in the FEIS.

[*X12] It also appears that the Forest Service has attempted to prevent its own population viability experts, such as Drs. Barry Noon and Kevin McKelvey, from making a rational assessment of the owl's viability. See Kareiva Declaration, filed herewith. This information is essential to making a rational and reasoned decision regarding managing the owl's habitat. The Forest Service's failure to include the information that Drs. Noon and McKelvey could have provided leaves the FEIS without any rational assessment of the owl's viability at all. Id. The Forest Service should immediately supplement the FEIS with this required information, before it issues the ROD. If the Forest Service refuses to perform a scientifically valid viability assessment to inform its decision, then we will have no choice but to seek to obtain this information in the course of any later proceedings.

Reply - We assume the comment refers to a model being developed by Drs. Noon and McKelvey, as "This information" is not defined in the comment. During the development of the EIS, the use of the spatially explicit life history model developed by Drs. McKelvey and Noon was considered. Three members of the EIS interdisciplinary team and the two contributing scientists (Drs. Marcot and Raphael) participated in a demonstration of the McKelvey model on September 1, 1991. Numerous contacts were made with Dr. Noon and other potential users of the model, including representatives from the Bureau of Land Management and the Recovery Team. After much deliberation, the EIS team concluded that it was premature to use the model. This conclusion is supported by Dr. Noon.

The main reasons that the model was not used were: 1) the model had not (at that time) been tested or subjected to sensitivity analysis, 2) data were not available for use, and 3) Drs. McKelvey and Noon's time was fully committed to other projects. Further, Dr. Noon advised the EIS team that it was premature to use the model to assess viability (pers. comm., Noon to O'Halloran, July 16, 1991 and February 29, 1992).

Whereas this model will likely aid decision makers in the future, it is important to note that the results of any model used to assess viability should only be used as part of an analysis. Models are most appropriately used to test specific hypothesis, not used as a sole factor in making decisions. It is imperative to consider all relevant factors relating to spotted owl viability. This was done in the FEIS. Thus, it is not imperative to use one model to assess viability.

[*X13] D. The Fish and Wildlife Service Has No Independent Basis for its Biological Opinion.

Based on conversations with Fish and Wildlife Service ("FWS") staff, we have determined that FWS did not perform any independent viability assessment to aid in preparing its biological opinion. FEIS, App. M.

Rather, FWS apparently relied on the FEIS's analysis, which, as Dr. Kareiva explains, is unscientific and meaningless. This explains why the Biological Opinion makes the same unsupported assertions, backed by no scientific evidence or analysis, as does the FEIS:

Therefore, the total population of northern spotted owls on the National Forests is expected to decrease in the short term.

Populations will eventually stabilize as habitat within the HCAs recovers to suitable condition and the HCAs become fully stocked with northern spotted owls.

Biological Opinion at 5.⁷ Thus, the Biological Opinion provides no independent support for the ROD or the FEIS's conclusions.

Reply - "When the [Fish and Wildlife] Service determines that additional data would provide a better information base from which to formulate a biological opinion, the Director may request an extension of formal consultation and request that the Federal agency obtain additional data to determine how or to what extent the action may affect listed species or critical habitat" (50 CFR 402.14 (f)). The Fish and Wildlife Service did not request additional information, or additional analysis because they found the analysis in the EIS to be adequate.

[*X14] E. The FEIS Does Not Assure the Required Coordination Necessary to Implement the Preferred Alternative.

As the Forest Service well knows, the ISC plan cannot be implemented unilaterally; the plan is predicated on complete adherence by all federal agencies. Yet, it is apparent that the federal government has failed to provide any indication that it will adhere to the plan. In fact, as the FEIS notes, the Bureau of Land Management ("BLM") has adopted its own "interim" plan that violates key components of the ISC plan.⁸

Reply - To date, the BLM has managed their lands in accordance with the biological opinions of the FWS, which effectively results in a level of protection similar to the ISC Strategy. The viability analysis was conducted using this "level of protection" assumption for BLM administered lands rather than a "complete ISC strategy adoption"; this is stated on page 3&4-51 of the FEIS. As a result of a jeopardy opinion from the Fish and Wildlife Service on 44 timber sales, the BLM has applied for an exemption from the requirements of the Endangered Species Act under Section 7(g). If the exemption is granted and the habitat is adversely modified, then this would be a cause for reexamining the management direction on National Forests. This is clearly stated in the FEIS on page 3&4-51 of the FEIS.

The response to the second comment on page L-A-1 of the FEIS presented this information as well.

[*X15] In response to this obvious problem, the FEIS bases its so-called "viability analysis" on the assumption that federal agencies will adhere to the consultation advice they receive from FWS pursuant to ESA 7(a) ("In assessing viability it is assumed that other Federal land managers will comply with Section 7(a) . . . of the Endangered Species Act." FEIS at L-A-1). However, BLM has already impeached this assumption by applying for an exemption from the biological opinion it received from FWS for 44 of BLM's timber sales. The Forest Service cannot responsibly adopt a plan that requires strict interagency cooperation on the basis of this record of interagency fratricide, particularly in the absence of disclosure of any

contingency measures that would or could be taken if the Forest Service's obviously unrealistic assumptions prove false.

Reply - An application for exemption from the biological opinion does not merit changing the preferred alternative. The FEIS's assumption of BLM management to the assumed level of protection is not compromised unless the application for exemption is actually granted and habitat is adversely modified. If the request is granted, it would then constitute significant new information, and the Forest Service and the Fish and Wildlife Service must consider the need for a reinitiation of formal consultation (Biological Opinion, Appendix M, page 6, and also page 3&4-51 of the FEIS).

The response to the second comment on page L-A-1 of the FEIS presented this information as well.

[*X16] F. The FEIS Contains No Monitoring Plan.

As the Court noted in the SAS case, the Forest Service should not be permitted to proceed under the ISC plan because "No monitoring scheme exists, although members of the ISC expected one to be in place by now." SAS, 771 F.Supp. at 1093. The FEIS fails entirely to cure this critical defect -- it too contains no monitoring plan. Instead of a monitoring plan, the FEIS simply lists "three categories of monitoring questions," but no scheme, plan or method to answer these questions. FEIS at J-2. In fact, there is even less to the FEIS's so-called "monitoring plan" than the ISC report included, which the SAS court found to be inadequate to justify further habitat loss.

Reply - The EIS incorporates the ISC Report by reference, including the ISC Appendix R which discussed research and monitoring. The FEIS states that Forest Service Spotted Owl Research and Development and Application Program has developed an integrated inventory, monitoring, and research program. After selection of the final alternative, this program will be tailored to the chosen alternative. Further, the Forest Service has shown good faith in this area. The majority of the research on the spotted owl has been and is funded or conducted by the Forest Service. Further, the Forest Service has completed spotted owl inventories in designated habitats, project areas, and other sites.

Summary

[*X17] The FEIS does not inform the decision-maker of the real environmental consequences of the proposed action -- the impact of continued logging of owl habitat on the spotted owl. As a result, the Secretary's up-coming decision in the ROD will necessarily be uninformed, arbitrary and capricious. We strongly recommend that the Forest Service take what additional time is necessary, which we believe to be nominal (2 to 3 months), and prepare a supplement to the FEIS that actually assesses the viability of the northern spotted owl's population. We would support an appropriate motion to the court in the SAS case that accomplishes this purpose while maintaining the existing habitat protection options pending a legally adequate NEPA document and a rationally supported decision.

DATED this 27th day of February, 1992

Reply - The FEIS does inform the decisionmaker of the environmental consequences of the proposed action. The decision will not be uninformed, arbitrary, nor capricious. The FEIS does actually assess the viability of the

northern spotted owl. The FEIS is an adequate NEPA document; there is no need for a supplement to the FEIS. The required three month comment period on a draft Supplemental EIS for a Regional Guide amendment, and the required delay between FEIS, ROD, and implementation combine to suggest the time required to supplement the FEIS would be a minimum of eight to nine months.

FOOTNOTES

¹ [footnote to comment *X1 above] These organizations may be submitting additional comments under separate cover.

Reply - Indeed, comments were received from the Oregon Natural Resources Council. Their comments, together with responses to them, are included earlier in this Appendix.

² [footnote to comment *X3 above] Recall that this ROD and FEIS are a substitute for the withdrawn SEIS and its ROD. The SEIS/ROD was an amendment to the Pacific Northwest Regional Guide. Thus, the Secretary's pending decision is, also, an amendment to the Pacific Northwest and Pacific Southwest Regional Guides.

Reply - The FEIS states on page 1-1 that the amendment of the two Regional Guides is one of two underlying purposes.

³ [footnote to comment *X5 above] The FEIS even admits that "[o]n National Forests with lands within the spotted owl's range in Oregon and Washington, the Forest Plans will be amended by the Record of Decision for this [EIS] with the standards and guidelines presented in the selected alternative." FEIS 2-36. What the FEIS fails to disclose is that this amendment is "significant," and thus triggers a revision of the affected forest plans. 36 C.F.R. 219.10(g).

Reply - The FEIS makes clear statements of the intent to amend Forest Plans (on page 2-36 and in the Purpose and Need statement on page 1-1). These amendments vary in their significance across the affected National Forests; those with conditions which have changed significantly will revise their Forest Plans.

⁴ [footnote to comment *X5 above] It is not sufficient to simply promise that "[t]he annual quantity of timber offered for sale will reflect the harvest implications of the standards and guidelines and the designated areas of the alternative selected,: as the FEIS states. FEIS at 2-36. First, the Forest Service has not shown that the "harvest implications" have been accurately calculated in the FEIS. For example, the FEIS admits to certain biases that cause the FEIS' [sic] "estimates" to be biased towards higher than sustainable allowable sale quantities. FEIS at B-6.

Second, the forest plan's allowable sale schedule must be "consistent with the goals, assumptions, and requirements contained in, or used in, the preparation of the . . . regional guide." 36 C.F.R. 219.16(a)(2)(i). The forest plan's ASQs, as they stand now, will be inconsistent with the regional guide's new standards and guidelines for spotted owl protection, upon issuance of the ROD.

Reply - The response to comment *X5 above explained the need to have harvest levels now which reflect the harvest implications of the standards and guidelines and designated areas of the alternative selected. This step to quickly implement this decision is not a long-term substitute for the analysis (based on localized knowledge and information, and with public involvement)

required in the regulations. The Forest Plans' allowable sale schedules will be made consistent with the regional guides' standards and guidelines.

⁵ [footnote in comment *X11 above] We have attempted to investigate who these unidentified individuals are. The administrative record includes some minutes from a meeting apparently intended to assign the viability "score" to the EIS alternatives and attended by about a dozen biologists. We contacted most of the biologists who were at the meeting and learned that, in every case so far, the individual biologist disclaim any direct involvement in establishing the viability ratings attributed to the committee as a whole. Several of the biologists explain that they were in attendance to listen, but not participate. Others state that they had no expertise in assessing the viability of wildlife populations and thus could not have participated in making these determinations, even if it was intended that they do so. Finally, according to some of the biologists, the meeting never resulted in the final viability rankings -- according to these persons, those rankings were made by the EIS interdisciplinary team ("IDT") members. This information is quite disturbing because the IDT members, who are identified in the EIS, include only one biologist, who admits that she is not an expert in assessing population viability. The remaining IDT members are economists, foresters, social scientists, and the like.

Reply - The public information about the December 11, 1991 viability analysis meeting for the FEIS is shared and described in response to comment *X11 above. No requests for notes of this meeting were received from the Sierra Club Legal Defense Fund. The narrative in this footnote seems unfounded. The meeting notes were available on request after publication of the FEIS. The biologists who participated were directly involved in rating the viability of the alternatives. The participants have significant credentials and expertise. The meeting did result in viability rankings of the Alternatives.

⁶ [footnote in comment *X12 above] Though the Forest Service is under court order to implement an owl habitat protection plan by March, we are confident that if the Forest Service explained to the court that it needed additional time to obtain needed information that it had previously withheld from the EIS, the court would look favorably upon a request for an extension of time in which to complete the EIS.

Reply - As noted in the response to comment *X12 and *X17 above, information was not withheld from the FEIS, the viability assessment is sound, and there is no need to supplement the FEIS.

⁷ [footnote in comment *X13 above] In addition to the FEIS, the FWS may have relied on the ISC report for this conclusion. If so, the FWS failed to recognize that this statement was an implied assumption of the ISC report and not the result of any analysis whatsoever. See Kareiva Declaration. We trust that FWS did not mistake the ISC's assumption as a statement of fact or even professional opinion -- it was not. To have done so would be clear error.

Reply - Robin Bown of the U.S. Fish and Wildlife Service was a participant in the December 11, 1991 meeting that assessed viability. While the FWS may have relied on the ISC report in part, it certainly had information about the analysis done for this FEIS.

⁸ [footnote in comment *X14 above] In addition, Secretary of Interior Lujan has announced that he intends to disregard the recovery plan prepared by his own hand-picked team and prepare a new plan that is not burdened by the law's requirements. How the Forest Service can credibly suggest adopting the ISC plan in the face of the Interior Department's track record is unfathomable.

Reply - The Secretary of Interior announced the formation of a team to provide alternatives to the recovery plan. To date, there has been no results from this newly formed team. The formation of a team to develop options does not constitute an intent to disregard, and therefore is not a relevant factor in this decision relating to spotted owl management.

The following indented text is a verbatim representation of the first Enclosure to the February 27, 1992 letter from Todd D. True addressed to the Spotted Owl EIS Team and received February 28, 1992.

RESPONSE TO THE DECLARATION OF DR. KAREIVA
SUBMITTED WITH THE COMMENTS FROM THE SIERRA CLUB LEGAL DEFENSE FUND

I, PETER KAREIVA, declare:

1. My name is Peter Kareiva. I am a Professor of Zoology at the University of Washington. I am an expert in Mathematical and Population Biology. I hold a Ph.D. from Cornell University in Ecology and Evolutionary Biology, with a minor in Mathematics. A copy of my curriculum vitae is attached to my earlier Declaration regarding the Forest Service's draft EIS.
2. I have reviewed the Final Environmental Impact Statement on Management for The Northern Spotted Owl in The National Forests ("FEIS"). As my earlier Declaration details, I am familiar with the existing literature on the owl's viability.
3. The FEIS' analysis of the owl's viability is essentially unchanged from the DEIS. Thus, my comments critical of the DEIS apply equally to the FEIS and I incorporate them here by reference. I will briefly summarize the major shortcomings in the FEIS' analysis and the reasons why these flaws cause the FEIS to paint a fundamentally inaccurate picture of the risks associated with adopting Alternative B, the ISC strategy.

Reply - The FEIS analysis was strengthened from that done for the DEIS. In particular, the FEIS was based on computer maps (GIS) of nesting, roosting, and foraging habitat, maps that were not completed for analysis in the DEIS. In addition, Criteria 1, 3, 5, and 7 were revised to incorporate new, spatially explicit, data.

A. History of Scientific Understanding the Spotted Owl Population Dynamics.

4. In order to understand how much out of step with current scientific thinking the FEIS is, it is useful to review briefly the scientific community's history of assessing spotted owl viability.

Reply - The FEIS incorporated the ISC Report. The ISC committee included many of the scientists who define the state-of-the-art of current scientific thinking. Several of these scientists were contributors and reviewers of the FEIS.

5. Dr. Mark Shaffer first noted in 1985 that the spotted owl had to be assessed as a "metapopulation," that is, a population made up of subpopulations. As Dr. Shaffer pointed out:

The conservation of patchily distributed species presents a complex problem for land-use planning and wildlife management. A new paradigm of population structure will be necessary to understand the extinction-persistence dynamics of such species both for site-specific

and regional conservation efforts. The metapopulation model provides a beginning conceptual framework for solving this problem.

Id. Dr. Shaffer highlighted "the importance of understanding localized extinctions and colonizations" in order to determine the fate of the entire population. Id.

Reply - This comment does not lend itself to a specific reply.

6. For the owl's population to persist, the rate of recolonization of spotted owl territories must meet or exceed the rate of local extinctions of territories caused by the death of the resident owls. Further, if habitat is changing through time, any analysis of these local extinction and recolonization rates must consider the effect habitat change is likely to have on the population's demography, that is, the rates of birth and death of individuals within the population. For example, a decrease in habitat may make food more scarce, thus decreasing the lifespan of adult spotted owls, which will increase the rate of local territory extinctions. Similarly, habitat declines across the landscape may make it harder for juvenile owls to locate habitat, thereby decreasing their survival and, in turn, decreasing the rate vacant territories are recolonized.

Reply - The EIS has considered the demographic information. Further, in the EIS, information on the size and spacing of habitat areas, and provisions for dispersal habitat were considered as part of the viability analysis because of the potential influence these factors have on spotted owls.

7. Utilizing Dr. Shaffer's suggestion that the owl be assessed as a metapopulation, Dr. Russell Lande applied mathematical techniques for assessing the metapopulation dynamics to the spotted owl:

The model employed here to predict the effect of future habitat alteration on the northern spotted owl population extends Levins' (1969, 1970) model of a metapopulation maintained by local extinction and colonization by including life history, territoriality, and dispersal behavior in a patchy environment (Lande 1985, 1987).

Id. at 606.

Reply - This comment does not lend itself to a specific reply.

8. Dr. Lande's analysis demonstrated convincingly that the Forest Service's circa 1984 plan -- the "SOHA" plan -- would likely cause the owl's extinction. The Forest Service had simply failed to look at the question of whether sufficient juvenile spotted owls would be born and successfully survive dispersal in order to recolonize territories vacated by the death of spotted owl adults. Though Dr. Lande's analysis was not sufficiently embellished with biological detail to define the exact habitat needs of the species, he was able to conclude that:

This analysis of territory occupancy indicates that only a plan involving preservation of the great majority of the remaining old-growth forest (e.g. Dawson et al. 1987) is likely to promote long-term persistence of the northern spotted owl population.

Id. at 606.

Reply - The preferred alternative abandons the "SOHA" plan and provides large tracks of habitat.

9. Subsequently, Dr. Daniel Doak, then working in my³ laboratory, adapted Dr. Lande's equations to a computer simulation model. Dr. Doak tested the effect habitat distribution or "clumping" has on the owl population's persistence. Again, as Drs. Lande and Shaffer had emphasized, Doak explicitly analyzed the rates of local extinction and local recolonization, given currently known and reasonable future estimates of the owl's demographic parameters. Dr. Doak reached much the same conclusion Dr. Lande had:

... given the projected decline in spotted owl populations at even current levels of habitat availability, suspension of all old-growth harvesting is the only prudent course of action in the forests of the Pacific Northwest.

Id. at 396.

Reply - The suspension of all old-growth harvesting would be beneficial for the owl, however it is not the only available course of action in the forests of the Pacific Northwest. While cessation of timber harvest of old-growth forest would be near optimal for the owl, this is not necessary to provide for a HIGH likelihood that the owl will continue to persist well distributed throughout its range.

10. The Interagency Scientific Committee ("ISC") was next to assess the metapopulation dynamics of the spotted owl. The ISC's analysis was based in large measure on Lande's analytical framework. In fact, the ISC's model of clustered territories was quite similar to Doak's model. The ISC found, as Dr. Lande had predicted, that there are habitat and population "thresholds" that, once exceeded, doom a population to eventual extinction (absent heroic direct intervention efforts, if such are even possible). The ISC also pointed out that there is probably a substantial lag between the time the threshold is crossed as a result of habitat destruction and a measurable population response. Thus, by the time it becomes dramatically obvious that owls are declining rapidly, it is probably too late to save the habitat necessary to stabilize the species' population.

Reply - Because there may be a lag in the response of the owl to habitat changes, a monitoring and research program is included as a part of the preferred alternative. It is important to monitor the spotted owl population to assess status of the species over time. Certain demographic parameters such as adult female survival rates, are likely the most sensitive estimates that could indicate a population response. For this reason, the FEIS recommends continuing demographic research in addition to monitoring population size (FEIS, Appendix J-3).

11. Notwithstanding these insights, the ISC proposed to allow continued owl habitat loss in the near-term based on the untested assertion that the owl population eventually would rebound from future low levels as habitat is re-grown within the proposed Habitat Conservation Areas ("HCA"). Thus the ISC Report states "An implied assumption of this conservation strategy is that the owl population will reach a new, stable equilibrium at some future time." ISC Report at 36 (emphasis added). In the ISC's words, this assumption is an untested "hypothesis." Id.

Reply - It is not possible to demonstrate with 100 percent certainty that a future equilibrium number of owls would be reached. However, results of simulation modeling conducted by the ISC (Appendix M of the ISC report), and analysis of habitat capability, indicate a high likelihood of owl populations

reaching a stable equilibrium. The Strategy calls for no further timber harvest within HCA's and for restricted harvest over intervening lands (the "50-11-40" rule). The system of large HCA's increases the likelihood of successful dispersal, increases the expected occupancy of suitable sites, and enhances reproduction success. The Strategy incorporates research and monitoring of spotted owl population trends and demographics. If trends indicate the strategy is not working as expected, the strategy allows for adaptive management to correct management direction.

12. It is important to understand how critical this "implied assumption" is to the ISC's assessment of its own plan's success. By carefully using the term "implied assumption," the ISC avoided addressing the crucial question of whether a population threshold would actually be reached during the period of continuing habitat loss (though it acknowledged the theoretical possibility), or whether the owl's demographic rates would actually rebound to levels sufficient to sustain the population (notwithstanding the significant habitat losses envisioned by the strategy).

Reply - This issue was addressed in the replies to numbers 11 and 13.

13. These threats to the owl's viability, all associated with the near-term period of on-going habitat loss envisioned by the strategy, are swept aside by the ISC's simple, untested "implied assumption." Yet, had the ISC actually tested the realism of this assumption, it would have found that the increases in demographic survival rates necessary to stabilize the population are far out-of-line with the owl's actually measured life history data. See e.g., Dr. Doak's analysis at 395 ("Even with a variety of unrealistically optimistic assumptions (no mate-finding problems, initially full occupancy of patches, higher-than-observed dispersal survivorship), some 3,000 and many 1,500 territory simulations predicted small and declining populations after 100 years.")

Reply - It is impossible to definitively state what will happen in the future. Projections of future conditions can be simulated, as was done in the ISC. To test some of the assumptions used in the simulations, the ISC performed numerous analyses to test the sensitivity of population simulation models to variation in various parameters such as cluster size, within-cluster search efficiency, between-cluster dispersal, juvenile behavior, and initial population size. The results of these analyses are well documented (ISC, Appendix M). In addition, initial estimates of parameter values for various life history traits were based on published values. Further, empirical data on the current condition of the landscape was considered. To guard against short-term risks, one goal of the strategy was to identify and protect key habitat areas and pairs of owls (ISC Report, p. 315). Further, dispersal habitat is provided in part to contribute toward a short-term viable population (ISC Report, p. 318).

14. Thus, the ISC's claims of success for its strategy must be read in light of its own "implied assumption." That is, the ISC's claim of confidence in its plan could be summarized as: "if one assumes that the major threats to the owl's near-term survival do not materialize, then the strategy is likely to work in the long-term." This is like saying "if you do not die today, then you will live until tomorrow," when the real question is "will you live through today?" Of course, it is important to

analyze the reasonableness (or lack thereof) of the underlying assumption before the conclusion can be accepted.

Reply - As noted in reply to number 13, numerous analyses were conducted to evaluate survival rates from year zero through 100 (ISC Report, Appendix M). These analyses included dynamic simulations of landscape pattern to evaluate whether populations would persist under likely habitat declines.

15. In summary, the analyses discussed above all share one critical feature in common. They acknowledge that the owl population's actual demographic statistics must be used to assess the effect changes in the amount and distribution of habitat will have on the population's ability to replace itself over time by recolonizing vacated territories. The ISC report, however, dismisses the near-term threats inherent in its analysis of viability thresholds by "implicitly assuming" that the population would stabilize, notwithstanding further habitat loss.

Reply - This issue is addressed in the replies to numbers 13 and 14. The ISC Report acknowledges further habitat loss and predicts population stabilization in the future, reflective of that loss, and of gains within HCAs.

16. As I discuss below, however, the FEIS' viability assessment fails entirely to address this issue -- precisely the issue that every other scientist has emphasized is the fundamental question in assessing the owl's future viability. In fact, it appears from the FEIS that the Forest Service still does not understand how to rationally assess a species' prospects for survival.⁴

Reply - This issue is addressed in the replies to numbers 17 through 24 below.

B. The FEIS Does Not Assess the Owl's Viability.

17. The FEIS acknowledges, but then fails to analyze, the critical problem facing the owl's viability discussed above:

As animals die, vacant sites must be reoccupied by other individuals. Unoccupied suitable sites might be recolonized by northern spotted owls if the intervening lands allow for reasonable chances of successful dispersal between sites. If sites are spaced too far apart, or if adequate dispersal habitat is not provided between sites, the sites will remain unoccupied more often than not. This will eventually cause population sizes to decline.

FEIS at 3&4-46. Rather than assess the rates of recolonization and extinction of owl sites using the owl's actual rates of birth and death, the FEIS resorts to unsupported assertion that the proposed HCAs are spaced "reasonably" and that sufficient habitat is provided for a "reasonable" number of successful dispersers. First, the FEIS defines "HIGH" in its scale of viability to include:

The number and distribution of owls is sufficient to avoid local extinctions and to provide for recolonization of vacant habitats.

FEIS at 3&4-93. Next, the FEIS, without any analysis or justification asserts that Alternative B meets the above test for a "HIGH" rating because:

Distribution of spotted owls and spotted owl habitat under Alternative B would provide for long-term interaction of spotted owls and spotted owl pairs within and among designated areas over time. Alternative B provides for nesting, roosting, and foraging habitat in large and

contiguous blocks. Alternative B also provides for a substantial amount of young forests to grow into nesting, roosting, and foraging habitat forest conditions over time within designated areas managed primarily for spotted owl habitat (Habitat Conservation Areas), further enhancing interaction of owls and recolonization of vacated sites.

Alternative B also designates movement and dispersal habitat among designated areas managed primarily for spotted owl habitat. This is a major provision that substantially enhances the occupancy rates of spotted owls within designated areas by allowing for recolonization among pair clusters. It would also likely result in well distributed populations over time.

Also, although spacing criteria of designated areas is similar to that of Alternative A, the larger cluster sizes greatly enhance both occupancy rates within designated areas and successful movement of owls among designated areas. These factors are critical to ensuring long-term persistence of spotted owl pairs within designated areas and populations.

FEIS at 3&4-96 (emphasis added). These paragraphs provide the FEIS' entire justification for its assertion that recolonization will exceed local extinction.

Reply - This quote from the FEIS is from the summary portion of the viability section of the document, Overall Viability Rating for the Alternatives, FEIS at 3&4-96 is based on the analysis presented in the FEIS at 3&4-51 through 92. The analysis provides information on:

- 1) Potential Change. Potential change in the amount, and rate of change of spotted owl nesting, roosting, and foraging habitat over time on National Forests;
- 2) Distribution. Provision on National Forests for designated spotted owl nesting, roosting and foraging habitat distributed throughout the range of the northern spotted owl, with emphasis on areas of concern;
- 3) Habitat Capability. Habitat capability, estimated as potential number of pairs of northern spotted owls, within each population over time on National Forests;
- 4) Dispersal Habitat. Provision for movement or dispersal habitat in National Forest outside of designated areas managed primarily for spotted owl habitat;
- 5) Spacing. Spacing between designated areas managed primarily for spotted owl habitat;
- 6) Patch Size. Provision for size and distribution of spotted owl nesting, roosting and foraging habitat patches within designated areas managed primarily for spotted owl habitat; and
- 7) Clustering. Provision for designated areas large enough to support multiple pair areas.

Further, information was incorporated by reference from the ISC Report and additional data that was reviewed as a part of the EIS (FEIS bibliography and Appendix D). Therefore, the statement that the EIS assigned a viability rating without justification is incorrect.

18. Yet, when parsed, it is apparent that the FEIS engages in circular reasoning and useless comparisons without ever analyzing whether actual recolonization of vacated territories will exceed death rates of adult owls

over time as habitat continues to be lost. In essence, the FEIS claims that "sufficient habitat is needed to assure recolonization, Alternative B provides sufficient habitat, and, therefore, recolonization is assured." Obviously, what is missing from this tautology is any basis for the FEIS' assertion that Alternative B provides sufficient habitat over time.

Reply - The only way to analyze whether actual recolonization of vacated territories will exceed death rates of adult owls over time as habitat continues to be lost is to monitor the population over time. This will be done. The FEIS calls for a research and monitoring program, and this will facilitate the necessary data collection and analysis.

Potential recolonization was simulated by the ISC (ISC Report Appendix M); this report is incorporated by reference into the EIS.

19. What the FEIS failed to do, and what every other scientist acknowledged as essential (and what the ISC assumed would occur), is to test the spotted owl's actual demographic statistics against the proposed habitat landscape to see if recolonization will actually occur at sufficient rates to offset local extinctions. This is precisely the analysis that Drs. Noon and McKelvey are prepared to undertake for the agency, but the Forest Service apparently does not want to know the answer.

Reply - The assertion that "every other scientist acknowledged as essential...is to test the spotted owl's actual demographic statistics against proposed habitat landscapes" is unfounded. Scientists reviewed the viability assessment process used in the EIS and provided favorable comments on the approach used. The inference that the Drs. Noon and McKelvey were prepared to undertake the analysis for this and that their spatially explicit model was ready to use for this EIS is unfounded. Dr. Noon advised the EIS Team that it was premature to use the model for this EIS (Pers. comm. Noon to O'Halloran, 7/16/91 and 2/29/92).

20. Though I cannot divine the reason behind the agency's reluctance to look at the real numbers, it may be because the owl's demography shows the population to be in such dire straits that no further logging could be rationally justified. As I discuss below, that is precisely what the most recent analyses of the owl's demography indicate -- analyses that the FEIS does not disclose.

Reply - The FEIS did consider "real numbers." The FEIS, by incorporation of the ISC Report, review of subsequent literature, and independent analysis did examine relevant information. The demographic analysis in the ISC was incorporated by reference into the EIS, and additionally, the draft report by Anderson and Burnham (1991. Draft manuscript "Estimated Rates of Population Change in the Northern Spotted Owl) was considered in the FEIS. The FEIS states, "After preliminary review of new studies, the demographic parameter values used in the ISC Report for determining spotted owl status and trend have not changed significantly (E. Forsman, Pers. comm.; 56 FR 40010)" (FEIS 3&4-35).

The inference that the use of one model will provide all needed insight into the questions regarding viability of the owl and provides "real numbers" is unfounded. Models are most appropriately used to test hypotheses. However, models are a function of the assumptions used to build them. The primary

factors in assessing viability should be the results of empirical studies of the spotted owl's ecology and life history. This was done in the EIS.

C. Recent Demographic Analyses Show the Owl Population's Decline Has Been Accelerating.

21. The U.S. Fish and Wildlife Service has recently analyzed spotted owl demographic data from the five study areas within the owl's range. Exhibit A, attached hereto. These five study areas are the only sites where sufficient data exist to make meaningful evaluations of the owl's population dynamics, according to the Fish and Wildlife Service. The analyses show that during the study periods, the population of resident female owl declined a statistically significant 10 percent annual rate on average. More significantly, these authors found that owl populations were significantly declining at each of the five study areas (in addition to the overall average) -- at no study site were populations found to be stable or increasing. Thus, the owl's population range-wide appears to be in trouble.

Reply - A draft of this report was available for and considered in the FEIS (FEIS 3&4-35). After preliminary review, it was concluded that this information did not represent a significant change in the status and trends for the owl. Declining trends were anticipated in the ISC Report.

A later version of the Anderson and Burhnam analysis was presented at the Endangered Species Committee hearings in Portland. The conclusions of the two versions are the same. This information does not run counter to the analyses presented in ISC Strategy and there is no need to change the strategy's standards and guidelines or process of implementation.

Because demographic parameters are crucial in determining status of the owl, this information has been referred to the Forest Service Oversight Team. This team, in conjunction with appropriate specialists, will further review this information and determine whether any modification of the implementation of the strategy on the National Forests should be recommended to the interagency Technical Review Team. This is the standard process for dealing with new information and is a part of the adaptive management process specified in the EIS.

The strategy is flexible and can accommodate changes. This is the adaptive management process that is a fundamental part of the strategy.

22. Even more alarming, the adult female survival rate declined during the study period. As a result, the rate of population decline accelerated during the study period.

Reply - See the reply to 21 above.

23. It is a mathematical and biological certainty that if this rate of population decline is not reversed the spotted owl will soon decline to extinction. When faced with a declining population of a species threatened with extinction, such as the northern spotted owl, the well-accepted and only biologically responsible practice is to identify the causes of the decline and intervene to correct these causes. In the spotted owl's case, the most likely cause of the population decline is habitat loss.

Reply - The EIS Team agrees that habitat loss is the major contributor to population decline. It was for that reason that the strategy is based on setting aside (and allowing for recovery) of habitat of sufficient amount and distribution to arrest this decline and eventually allow limited population recovery. The current decline in population is expected and allowed for in the strategy. Sufficient habitat and future habitat is protected to provide a high likelihood of viability.

24. Instead of immediately intervening to correct the cause of population declines -- habitat loss -- the ISC chose to permit further loss to occur. The ISC would allow additional habitat loss during the next 50 years pending an eventual balance between regrowth of habitat within protected areas (including HCAs) and loss of habitat outside protected areas. But, the ISC never evaluated, nor does the FEIS, whether the owl's population would decline below an extinction threshold during this period of habitat loss. Given the Fish and Wildlife Service's recent demographic analysis, I must conclude that there is a significant and very real threat that this is precisely what will occur.

Reply - The results of simulation modeling conducted by the ISC did not reveal a significant likelihood that owl populations would fall below an extinction threshold. However, such a threshold has not been defined.

This issue is also addressed in the response to the third comment on page L-A-33 of the FEIS which states: "The provision for large designated areas to be within close proximity to each other throughout the range of the owl, coupled with the other provisions in the ISC Strategy, are more important for spotted owls than the absolute amount of habitat. A decline in spotted owl habitat was recognized by the Interagency Scientific Committee and is documented in this EIS. The decline in northern spotted owl nesting, roosting, and foraging habitat due to timber harvest is included in the calculations of potential change in owl habitat over time in the viability analysis, criterion 1. Although the amount of habitat will be less in the short term over all areas and permanently less in the Forest Matrix, both the ISC Report and the analysis in this EIS rate the viability of the northern spotted owl as HIGH in the long term in Alternatives B, C, and D. This HIGH rating is, in part, because the regrowth of habitat will exceed harvest rates under these alternatives."

This issue is also addressed in the response to the fourth comment on page L-A-34 of the FEIS which states: "The absolute value which assures viability or precipitates extinction is unknown. It is not simply an absolute number of owls that could assure viability, the amount and pattern of habitat are primary factors in providing for a viable population.

"Research and monitoring of northern spotted owl populations will provide opportunities to evaluate management, and alter the current direction if needed. Management direction is conservative enough to allow detection of any adverse effects to spotted owls in sufficient time to use the adjustment process to preserve long-term viability."

This concern is also addressed in the response to the first comment on page L-A-34 of the FEIS which states: "Under any alternative spotted owl numbers will decline in the short term. The ISC Report views the above referenced 50 percent decline as a worst-case scenario that assumes no owls will occur in the Forest Matrix between HCAs. This EIS accounts for owls in the Forest Matrix.

An assumption of the ISC Strategy is that the overall number of spotted owl pairs is less important than the distribution of pairs (size of spotted owl clusters and distances between them). The ISC Strategy (Alternative B) results in a reduced population when compared to present levels, but a much more secure population due to size, spacing, and security of habitat. The habitat capability calculations in this EIS estimate a 26 percent decline under Alternative B from current habitat capability levels. The arrangement of habitat in large blocks that are adequately spaced compensates for a smaller population".

This issue is also addressed in the response to the first comment on page L-A-35 of the FEIS which is quoted, in part, in response to number 28 below.

D. The FEIS Does Not Respond to or Acknowledge the Criticisms Made of the ISC Plan.

25. In the Seattle Audubon Society v. Evans trial, several scientists, including myself, pointed out that the ISC plan imposed significant risks to the spotted owl's viability; some of which were acknowledged by the ISC and others overlooked (such as the crucial concern I discuss above in Section C). Dr. Gordon Orians provided a cogent summary of these risks in his trial testimony. Dr. Orians pointed out that all of the analyses of owl population dynamics reveal the existence of viability "thresholds":

I think these analyses are in general agreement on a number of points. And one is that there are thresholds out there which when crossed change the prospects for viability fairly rapidly. That it's not a simple linear response that as you remove habitat, the probability of successful viability is just going down proportionately. It says that there are places you reach when it changes fairly rapidly. All the models and analyses suggest something of this sort.

Trial Transcript ("TR") at 51.

Reply - Our analysis indicates that Alternative B has a high likelihood of providing for a viable population of the northern spotted owl.

26. The FEIS' response to the concern with viability thresholds completely misses the point. In the response to public comments section, the FEIS states:

Comment: The rate of harvest of nesting, roosting, and foraging habitat outside HCAs exceeds regrowth of habitat in all areas. This loss may decrease habitat below the viability threshold.

Response: . . . Although the amount of habitat will be less in the short term over all areas and permanently less in the Forest Matrix, both the ISC Report and the analysis in this EIS rate the viability of the northern spotted owl as HIGH in the long term in Alternatives B, C, and D. This HIGH rating is, in part, because the regrowth of habitat will exceed harvest rates under these alternatives.

FEIS at L-A-33 (emphasis added).⁶

Reply - The quote from the FEIS is incomplete. The response to the comment actually states: "The provision for large designated areas to be within close proximity to each other throughout the range of the owl, coupled with the other provisions in the ISC Strategy, are more important for spotted owls than the absolute amount of habitat. A decline in spotted owl habitat was recognized by

the Interagency Scientific Committee and is documented in this EIS. The decline in northern spotted owl nesting, roosting, and foraging habitat due to timber harvest is included in the calculations of potential change in owl habitat over time in the viability analysis, criterion 1. Although the amount of habitat will be less in the short term over all areas and permanently less in the Forest Matrix, both the ISC Report and the analysis in this EIS rate the viability of the northern spotted owl as HIGH in the long term in Alternatives B, C, and D. This HIGH rating is, in part, because the regrowth of habitat will exceed harvest rates under these alternatives."

This complete response indicates that the provisions for blocks of habitat, spaced within a distance that facilitates dispersal are some of the factors that will provide for the owl in the near-term. Other provisions in the strategy, such as provisions for dispersal and the monitoring and research program, provide additional assurance for the owl.

27. The FEIS dismisses the threat to the owl's viability associated with crossing a population viability threshold in the short term as habitat declines by claiming that, in the long term, there will be more habitat for the owl 100 or more years in the future. But that future promise of habitat is not going to help the owl if its population sinks below a population viability threshold in the short term. The FEIS ignores completely this critical near-term (which has permanent long-term consequences if realized) threat -- that current population declines combined with habitat loss will push the species past a point from which it cannot recover, regardless of how much habitat is regrown at some distant future date.

Reply - There is a potential threat to the owl in the short term and the long term. It is not possible to provide 100 percent assurance for the viability of a species. However, the standards and guidelines provide for large blocks of habitat, dispersal habitat, and in the short term, identify and protect key habitat areas and pairs of owls (ISC Report, p. 315). The standards and guidelines, coupled with the monitoring and research program result in a strategy that is likely to result in a HIGH probability of continued existence of the owl. Further, see reply to 26 above.

28. In addition, instead of responding substantively to the reality of population thresholds for the owl, the FEIS parrots back the ISC's predictions of confidence in their plan:

Comment: Concern was raised that spotted owls will not survive the transition from today's distribution of nesting, roosting, and foraging habitat to the ISC Strategy's projected future landscape.

Response: The ISC Strategy was given an overall viability rating of HIGH in both the ISC Report and this EIS with recognition that habitat will decrease in the short term. The ISC Strategy was rated as providing a VERY HIGH probability of sustaining spotted owl populations for at least 50 years (Thomas et al. 1990: 39). The ISC Strategy provides for a pattern and distribution of habitat to minimize risk to the spotted owl.

FEIS at L-A-35. This is but one of the many examples of an unsupported assertion, devoid of any real analysis or scientific reasoning, the FEIS includes as justification for its preferred alternative. Rather than provide a rational explanation for why the Forest Service believes that the owl's precipitously declining population will reverse itself as habitat

continues to be lost, the FEIS claims that "since the ISC stated its strategy will work, it will work." But, as I discussed above (para. 13), the ISC had no empirical, theoretical, or other basis for believing the owl's population would remain above the viability thresholds during the period of continued habitat loss and thus eventually stabilize -- the ISC simply assumed that would be the case. The FEIS converts this assumption to circular reasoning of the crudest sort -- "don't worry about the transition period of habitat loss because the ISC assumed there is nothing to worry about!"

Reply - Again, this is a partial quote from the FEIS. The second response on page L-A-35 also states: "The standards and guidelines of the ISC Strategy, such as those for designated areas and dispersal habitat, are designed to provide for a viable population of northern spotted owls. An example of how the ISC Strategy accounts for particular areas is that in areas of concern, Category 1 or 2 HCAs are delineated, and in some areas, Category 3 HCAs are required. The EIS viability analysis for this environmental impact statement recognized that there is an expected loss of habitat at year 50, but after review of the entire Strategy, Alternative B was given an overall viability rating of HIGH."

The commenter misses the point that the strategy is designed to provide for continuous distribution of breeding pairs, restoration in key areas, interaction among pairs and subpopulations, and that the strategy requires monitoring and research. In the short term, key habitat areas and pairs of owls will be provided for (ISC Report, p. 315).

29. Dr. Orians also pointed out certain significant risks associated with the ISC strategy when it is fully realized (assuming the owl's population survives the near-term loss of habitat discussed above):

The most critical assumption, I believe, is the one which says a dispersing juvenile owl will search first thoroughly within the habitat conservation area in which it was born and if there is a vacancy there of a suitable kind, it will occupy that vacancy before it disperses outside of the natal habitat conservation area to look for another one.

TR at 62-63. Dr. Orians explained why this is an optimistic assumption: The assumption is questionable because the data that are so far available from dispersing juvenile owls does not provide any evidence that they search preferentially close to where they were born, but that they set off in approximately random directions and go substantial distances.

It happened to be a very optimistic assumption because it makes the viability look much more certain than it would be if the individual juvenile owls continued to disperse more or less randomly.

TR at 64.

Reply - The ISC's assumption about within-cluster searching behavior may be optimistic. However, the models do not assume the degree of success implied by this comment. Juvenile dispersal was calculated at about 65 percent successful. Coupled with a predispersal survival rate of 0.6, first year survival of juveniles is about $(0.6) * (0.65) = 0.39$, a value only slightly higher than current empirical estimated first year survival, about 0.30. In addition, the ISC conducted a sensitivity test on thoroughness of search (ISC Report, Figure M24). For small clusters (<10 pairs) the assumption is

significant, but for larger clusters (>20 pairs) the effect of within-cluster search efficiency was relatively insignificant. Unfortunately, there are no empirical data to directly evaluate this assumption.

30. This is a critical issue. The only way that the ISC was able to demonstrate population stability within the clusters in the promised future landscape (setting aside the short-term) was by assuming that within-cluster juvenile dispersal would be much more successful than currently observed juvenile dispersal success. See Doak Testimony in SAS case, TR at 163-165. Indeed, the FEIS dismisses this risk (and, apparently, all of the concerns raised by other scientists) as follows:

In the court transcripts for SAS v. Evans, Doak, Orians, and Kareiva critique the ISC Strategy, particularly the modeling. Modeling was only a part of the ISC Strategy. The ISC utilized the best available information and professional judgment in the development of the ISC Strategy. It is the most scientifically credible plan for management of the northern spotted owl developed to date.

FEIS at L-A-23. Actually, Doak, Orians and Kareiva did not criticize the models. They criticized the ISC's failure to appreciate the implications of model results for the owl's future.

Reply - This issue is addressed in the reply to number 29 above.

31. In any event, the concern with juvenile dispersal behavior has nothing to do with models. Simply put, if juvenile owls do not change their actual behavior as assumed in response to the future clustering of habitat (100 years or more from now), then many of the assumed benefits to the owl from their future clustering will be unrealized. By that time it will be too late to reclaim the habitat surrounding the clusters, which will have been logged decades earlier. Anytime a scientist assumes that nature will change substantially in order to justify a course of action, that action is inherently questionable and quite risky because; far more often than not, nature does not respond as anticipated. Neither the ISC report nor the FEIS address the risk inherent in the ISC's unsubstantiated projection that juvenile survival rates will increase several fold.

Reply - The ISC does not assume a change in actual behavior of juveniles over time. The cluster model suggests greater dispersal success in larger clusters; this results from greater probability of locating a suitable site, not a change in dispersal behavior.

32. In summary, the FEIS either fails to acknowledge criticisms of the ISC plan altogether, or where it acknowledges the criticism, its explanation misses the point. Basically, the FEIS chooses to draw attention only to those scientists or documents that agree with its "don't worry, feel good" message, while disregarding critics of the ISC plan. More serious than its disregard of critics, the FEIS simply fails to conduct any rational viability assessment of the owl using existing demographic data. Thus the FEIS does not demonstrate, nor even attempt to demonstrate, that the present observed and documented decline in the owl's population will be reversed as habitat continues to be lost in the near-term.

Reply - This comment has been addressed in the replies to numbers 25 through 29.

E. What the FEIS Puts Forward as a Viability Assessment is Meaningless.

33. Astoundingly, The FEIS' "population viability analysis" lacks any real analysis of the owl's population altogether. The FEIS uses seven "criteria" to "index specific population parameters . . ." FEIS at 3&4-47. In fact, none of these criteria measure anything about the owl's population itself -- they are all different ways of counting acres of owl habitat.

Reply - Most of the criteria used to assess viability in the FEIS were appropriately based on measures of amount and distribution of habitat. However, Criterion 3, Habitat Capability, does address owl populations (FEIS, 3&4-73 through 77). This criterion incorporates the territory-cluster model (from ISC, Appendix M) to estimate occupancy rates of suitable sites by pairs of owls. In addition, Criterion 7, Clustering, addresses likely numbers of owls occurring in each designated area based on habitat capability and occupancy rate, again using the territory-cluster model (FEIS, 3&4-87 through 91).

34. Thus, FEIS Criterion 1, "Potential Change" is a summing of the acres of owl habitat grown and logged through time. FEIS at 3&4-47. Criterion 2, "Distribution" describes where the owl habitat is located in the Pacific Northwest. Id. Criterion 3, "Habitat Capability," is an inventory of the proportion of the landscape that consists of owl habitat in different areas of the owl's range. FEIS at 3&4-48; App. B-11. Criterion 5, "Spacing," measures the distance between areas managed for owl habitat. FEIS at 3&4-49. Criterion 6, "Patch Size," measures the size of contiguous patches of owl habitat, and Criterion 7, "Clustering," states whether or not habitat patches are clustered on the landscape. FEIS at 3&4-49 and 50.

Reply - This is addressed in the reply to number 33 above.

35. These seven criteria are simply different measures of the same variable -- owl habitat. In essence, all the FEIS does is take a map of the owl's habitat and with ruler and dot-grid in hand, add up the acres of owl habitat in various areas and report these acres in seven different ways.

Reply - This is addressed in the reply to number 33 above.

36. Fundamentally, what is completely missing from the FEIS is any evaluation of how the owl's actual population will change through time, given the existing habitat and the changes in habitat as it is logged and regrown in differing configurations. The failure to address in any way how the owl's population will respond to changes on owl habitat renders the FEIS viability analysis useless for assessing the actual future viability of the owl.

Reply - Criteria 3 and 7 are estimates of potential owl populations that are sensitive to the amount and distribution of habitat. These criteria were analyzed to assess response of owl populations to the size of designated areas using the territory-cluster model from the ISC. This model yields an estimate of occupancy rates of pairs based on the proportion of an area that is habitat and the expected number of pair sites that could occur (unadjusted habitat capability). Other things being equal, smaller clusters have lower expected occupancy rates than larger clusters. Thus, the FEIS does address how owl populations are predicted to respond to changes in habitat.

37. The Forest Service has staff that are quite capable of performing a scientifically credible viability analysis -- Drs. Barry Noon and Kevin McKelvey are presently capable of performing a scientific viability analysis. The Forest Service's argument that the Noon-Mckelvey analysis is not ready to use rings hollow to me. I attended a seminar Dr. Noon presented at an international conference on global change and habitat fragmentation at the Friday Harbor Laboratories, a part of the University of Washington, where he described in detail his analysis. There is no question in my mind that Dr. Noon is prepared to answer the critical issues I have discussed in this statement that the FEIS ignored. Dr. Noon's spotted owl population analysis is ready to go; he lacks only the Forest Service's support and geographic information system maps the Forest Service has in its possession, but has refused to provide to Dr. Noon.

Reply - Dr. Noon has advised the EIS team that it would be premature for the EIS to have used the the Spatially Explicit Life-history Simulator model (see reply to number 19 above). Further, Dr. Noon has not requested the geographic information system maps for Washington, Oregon and Northern California (Noon to O'Halloran 2/29/92, Pers. comm.) Thus the statement that information has been withheld from Dr. Noon is incorrect.

38. Finally, the FEIS claims to rely on the professional judgment on a committee of unknown and unnamed biologists:

The viability ratings were established by a panel of spotted owl scientists and biologists. The overall rating for each alternative combined quantitative analyses with the panel's collective professional judgment and specific scientific knowledge of spotted owl population dynamics and habitat conditions.

FEIS at S-17. It is impossible for me (or anyone else) to evaluate either the credentials of these unknown persons or the basis for their opinions. The FEIS provides neither set of information.

Reply - The notes from the viability analysis meeting for the FEIS are a part of the administrative record. The list of participants is included in the meeting notes, and are listed in this response. The credentials of the participants are included in the FEIS, List of Preparers. The meeting notes are available upon request; however, no requests for the meeting notes for the viability assessment conducted for the FEIS have been received from this commenter or from Sierra Club Legal Defense Fund.

Participants at the viability analysis meeting for the FEIS held on December 11, 1991 were: Kim Mellen, Kathy O'Halloran, Dr. Martin Raphael, Dr. Bruce Marcot, Grant Gunderson, Dr. Jack Ward Thomas, Dr. Eric Forsman, Robin Bown, and Dr. Charles Meslow. Marilyn Stoll recorded the proceedings. Jerald Hutchins attended, but did not participate in the meeting.

SUMMARY

39. The FEIS is a staggering disappointment. In regard to the viability analysis, it is not a scientifically credible document -- in fact, it bears a striking resemblance to the previously discarded SEIS prepared to support the old SOHA plan. The recent assessment by Drs. Anderson and Burnham of the demographic study areas shows that the owl's population has declined rapidly and the decline has been accelerating. These data, together with the serious

concerns regarding the owl population's ability to replenish itself through time argues strongly against any further loss of the owl's remaining habitat while additional habitat is recruited in order to help stabilize the population.

Reply - The FEIS is a credible document. All relevant information was evaluated and considered in the viability assessment. The actual determinations of the viability ratings were conducted by some of the leading experts on spotted owls.

The assessment by Drs. Anderson and Burnham has been referred to the Forest Service Oversight team. This team, in conjunction with the appropriate specialists, will evaluate the information and determine if any modification of the strategy should be recommended to the Interagency Technical Review Team. This is the standard process used to evaluate new information as part of the adaptive management process. The adaptive management process is a part of the strategy. This strategy is a flexible, working strategy.

The second issue of potential threats to the population in the near term have been accounted for in the strategy. The provisions for the size and configuration of designated habitat areas, the provision for dispersal habitat, the requirement for category 3 HCAs in certain areas and the incorporation of a research and monitoring plan result in a high likelihood of providing for a viable population. There is an element of risk. There can not be an absolute guarantee, but given the provisions of the strategy the risk to the owl is minimized and the likelihood of viability is high.

FOOTNOTES

¹ See Shaffer, M.L., 1985, "The metapopulation and species conservation: The special case of the northern spotted owl," in Gutierrez, R.J. and A.B. Carey, Ecology and Management of the Spotted Owl in the Pacific Northwest, Gen. Tech. Rep. PNW-185, USDA - Forest Service, Portland, OR.

Reply - No comment required.

² Lande, R., 1988, "Demographic models of the northern spotted owl (Strix occidentalis caurina), Oecologia 75:601-607.

Reply - No comment required.

³ Doak, D., 1989, "Spotted owls and old growth logging in the Pacific Northwest," Conservation Biology 3:389-396.

Reply - No comment required.

⁴ That is not to say that the agency is without employees who understand these issues. Dr. Barry Noon, for example, has evinced a clear understanding of how to assess properly the owl's viability, but, as I discussed in my previous statement, the Forest Service has disregarded his analyses.

Reply - This conclusion is unfounded, see replies to 19, 20 and 37 above.

⁵ The Fish and Wildlife Service analysis apparently was available to the Forest Service and could have been considered in the FEIS. The analysis is Appendix C to the draft spotted owl recovery plan, which was transmitted to the Secretary of Interior in December of 1991. The Forest Service is a cooperator on the recovery team.

Reply - The FEIS does refer to this analysis (FEIS at 3&4-35), which was provided to the EIS Team as a separate draft manuscript. The draft spotted owl recovery plan was not available to the EIS Team.

⁶ The FEIS repeats its tautological justification at page L-A-37: The interdisciplinary team recognized a decrease in habitat at 50 years for Alternative B. Three factors led to the overall HIGH rating. First, total acres of nesting, roosting, and foraging habitat are expected to increase over current amounts by year 100 so long-term likelihood of persistence is high. Second, the habitat decrease at the 50-year point is temporary and the viability analysis shows an increase in subsequent years. And third, because the ISC Strategy calls for well distributed, large clusters of spotted owls, survival and replacement of owls in reproductive pairs is expected to be high. Here, again, the FEIS mixes apples and oranges. One cannot dismiss the risks associated with near-term habitat loss and viability thresholds by relying on long-term habitat recruitment -- by then it may well be too late for the owl. The third explanation regarding large clusters of owls is also irrelevant in the near-term. As discussed more fully in the text below, the HCAs will not enjoy clustered habitat until after habitat recruitment has occurred within the HCAs -- many decades in the future beyond the time of critical near-term risk.

Reply - It is not clear whether owls currently interact as if part of a large cluster. Current data on the distribution of pairs of owls indicate this is a reasonable assumption. Therefore, the analysis of current habitat capability was performed assuming pairs of spotted owls interact within provinces (FEIS at B-11).

⁷ There are two kinds of population viability thresholds -- habitat-related and population number-related. The first is the one that has received the most analysis by Drs. Lande, Doak and the ISC. It concerns how the amount of habitat affects the ability of an owl population to find vacant habitat patches to colonize. The second is, in a sense, the flip side of the first. It concerns whether there are sufficient numbers of owls to find each other. Thus, the concern at the end of the period of habitat loss is whether, given the current precipitous rate of population decline, whether there will be sufficient owls to successfully find each other in order to breed and repopulate the newly growing habitat.

Reply - The relationship of mate-finding success to amount and distribution of habitat is not known. However, two-sex, single-territory simulation studies conducted by the ISC (ISC at 44) showed that effects of mate-finding uncertainty on territorial occupancy become negligible when the proportion of the landscape that is suitable exceeds about 40 percent. These results suggested that mate-finding ability is probably relatively unimportant within large clusters (>20 pairs) with >40 percent habitat. Data presented in the FEIS (3&4-56, Table 3&4-7) indicate that, for Alternative B, current habitat is about 47 percent of the total designated area. Therefore, the EIS Team does not find reason to believe mate-finding ability is a likely limiting factor.

⁸ Dr. Orians summarized this point as follows:

If, however, the owls disperse in other ways more consistent with what we now know, the habitat occupancy rates are likely to be somewhat lower. So, therefore, I'm not convinced that the extinction rates within habitat conservation units will be as low as the committee assumes.

TR at 68.

Reply - See reply to footnote number 7 above.

⁹ For example, at page 3&4-97, the FEIS cites the ISC report, the Scientific Panel on Late Successional Forest Ecosystems (which included Dr. Thomas who chaired the ISCO, and the U.S. Fish and Wildlife Service as authorities agreeing the ISC plan posed few risks to the owl. The only mention that any scientist might believe otherwise is a passing reference in the response to public comments.

Reply - The EIS considered all relevant information, including criticism, on the alternatives and on the process used to assess viability. The process used to assess viability reflected comments provided by spotted owl experts and scientists, and several participated in the analysis of viability afforded by the alternatives.

ADDITIONAL ENCLOSURES TO THE COMMENTS ON THE FEIS BY
SIERRA CLUB LEGAL DEFENSE FUND

Exhibit A: A draft of David R. Anderson and Kenneth P. Burnham's "Demographic Analysis of Northern Spotted Owl Populations" was enclosed as "Exhibit A" to the above Declaration of Dr. Peter Kareiva. It is enclosed following this Appendix.

Second Enclosure: The Sierra Club Legal Defense Fund enclosed their comments on the Draft EIS, and incorporated them by reference into their comments on the Final EIS.

Their comments on the Draft EIS (and responses to them) are part of Appendix B to this Record of Decision, and are incorporated by reference. Since they are available in the following Appendix, they are not duplicated here.

RESPONSE TO COMMENTS RECEIVED FROM AMERICAN FOREST RESOURCE ALLIANCE

The following indented text is a verbatim presentation of the letter dated February 28, 1992, from James M. Sweeney addressed to Jerald N. Hutchins and received by the Spotted Owl EIS Team on March 2, 1992.

American Forest Resource Alliance
1250 Connecticut Avenue, N.W., Suite 200
Washington, D.C. 20036

February 28, 1992

Jerald N. Hutchins
Spotted Owl EIS Team Leader
USDA-Forest Service
P.O. Box 3623
Portland, OR 97208

Dear Jerald:

[*F1] Following are comments on the "Final Environmental Impact Statement on Management for the Northern Spotted Owl in the National Forests" submitted on behalf of the Spotted Owl Subgroup of the Wildlife Committee of the National Forest Products Association and the American Forest Council. These comments address what we believe is the Forest Service's incorrect evaluation and viability assessment of "A Multi-Resource Strategy for the Conservation of the Northern Spotted Owl."

Reply - As the following replies collectively indicate, the contribution of Alternative E (the Multi-Resource Strategy presented in November and December of 1991) to the viability of the northern spotted owl was correctly evaluated in the FEIS.

[*F2] It is important to note for future discussions relative to the actual viability of the multi-resource strategy, that the Forest Service analysis was not conducted on the most recent version of the strategy. The multi-resource strategy was revised in response to comments received from more than 17 professional peer reviewers, and re-published in January, 1992. Hopefully much of the confusion that led the Forest Service to a clear mis-interpretation of the proposed strategy has been eliminated in the revised document.

Reply - The EIS Team understood the Multi-Resource Strategy would continue to evolve as the result of peer review, EIS analysis, and for other reasons. However, the Strategy along with standards and guidelines and mapping criteria were presented to the EIS Team for inclusion as Alternative E on November 15, 1992. The staff of the National Forest Products Association who supplied the Strategy understood that the November 15 standards and guidelines would be the version on which the analysis would be based. This understanding and agreement is the subject of numerous documents included in the Administrative Record. For example, on November 21, 1991, after telling NFPA the Strategy would be included in the FEIS as Alternative E, the Team allowed NFPA to do minor editing, noting (11/21/91 memo, Hutchins to Mickey): "You will have a Camera-ready copy of your strategy document, and/including a final copy of your mapping Criteria and Standards and Guidelines, to us here by December 9. There will be no changes from what we already have that will affect our analysis."

The EIS Team is not in a position to analyze additional iterations of the Strategy. The following comments will only be addressed from the standpoint of the Multi-Resource Strategy as it was presented to the Interdisciplinary Team by the National Forest Products Association for inclusion in the EIS, which was included in the FEIS as Alternative E.

The EIS Team has yet to receive a copy of the re-published version of the Strategy, and was not informed that the January 1992 version existed.

(*F3] The subsequent discussion is therefore presented as clarification of our strategy. We believe that once you consider the following points, you will see there is clear support for reevaluation of our strategy. When evaluated correctly, we believe the viability of our strategy will compare favorably with the preferred alternative.

Reply - Many of these clarifications are subsequent to the Strategy was it was submitted for evaluation as Alternative E in the FEIS. The Strategy in the FEIS was evaluated correctly.

Sincerely,

/s/ James M. Sweeney
JAMES M. SWEENEY
Director, Wildlife Ecology

Enclosures

I. Only part of the multi-resource strategy was used in its viability assessment.

[*F4] First it must be noted that the multi-resource strategy was developed as a management alternative to the preservation strategies already developed. As such, it defines a role for all ownerships -- not just National Forest, and not just federal. While we understand that the FEIS must look at the impacts of the various alternatives on Forest Service lands, it is totally misleading to evaluate the viability of the multi-resource strategy solely on one part of the plan -- Forest Service lands. When this plan was submitted as an alternative, the authors were assured that there would be a clear statement that our strategy involved their ownerships, and thus should have [sic] a higher viability than that shown by evaluation only on National Forests. Unfortunately no such discussion was included in the FEIS.

Reply - The staff who authored the Multi-Resource Strategy were assured that the analysis for Alternative E would apply only to National Forests, and documentation during development of the Alternative indicates they knew this. For example, EIS team member Ken Denton's documentation of November 15, while six NFPA representatives were preparing maps of the Forest Service portion of their Strategy, states: "In early afternoon, two or three of them realized that their multi-ownership strategy and the part that WE [the Forest Service EIS team] were going to analyze in our document were two different things. They expressed concern to me over what was the use of this, if we weren't going to analyze or display their COMPLETE strategy. I discussed with them our approach, similar to ISC, and how their written strategy would be expressed, but how we'd do our analysis based on the assumptions we could trust or

control. We would not, for instance, assume more than ESA [compliance] on BLM [managed lands], and other legal requirements on private [lands]." The issue was clearly discussed at that meeting, and the Forest Service position was clear.

This approach is identical to that of the other alternatives, with every map carrying the note "Alternative applies only in National Forests". The ISC Strategy similarly covers more than just the National Forests, but the EIS states "The alternatives studied in detail in this environmental impact statement apply only to National Forests (FEIS 2-75). The analysis assumes simply that other agencies and private landowners would conform to the Endangered Species Act.

Further, it is unclear to the EIS team why the authors of the Multi-Resource Strategy continue to present the strategy as including contribution from private lands. The EIS team could find no standards and guidelines, or any other statement, that indicated private land would contribute to the strategy in any way other than voluntarily or as required by existing law. The team has previously searched the Strategy on this point and found the following references either as specific direction of indicators of intent as to where the strategy should be applied (page numbers refer to the December version of the Multi-Resource Strategy included in the FEIS as Appendix K):

Page ii - "MPAs....include suitable owl habitat on federal lands..." (emphasis added)

Page ii - "...private landowners represent potentially important contributors to the development and maintenance of suitable owl habitat..."

Page 4 describes designating MPAs from "federal lands". (emphasis added)

Page 5 - "Deferred MPAs....where timber harvest on federal lands is to be deferred..." (emphasis added)

Page 6, refers to the private lands as "a unique opportunity to develop a management strategy(s) independent of what occurs on the federal landscape to the east" (emphasis added).

Page 7 - "...additional strategies such as managing all National Forest lands on long rotations...." (emphasis added)

Page 7 and 8 - Managing for owls in southwestern Washington and northwestern Oregon "...would require unbearable direct and opportunity costs."

Page 8 suggests continuing to develop a plan for private lands of coastal California "...sensitive...to landowner objectives."

Page 9 - "This strategy would incorporate a full mix of operational alternatives..... By removing these restrictions, and incorporating management flexibility, the private landowner would be provided with the incentiveto voluntarily contribute to the development and maintenance of suitable owl habitat..." (emphasis added)

Page 10 - "Forest management prescriptions must be sensitive to local owl population densities, forest stand (age-class distribution, structure, etc.) conditions, and landowner objectives." (emphasis added)

Page 17 has a standard intended for California west of the National Forests: "...develop and implement strategies from site specific plans to regional habitat management strategies."

Page 22 - "Additional capability to support dispersal beyond the MPAs and single- or few-pair sites in this proposal is provided by late-successional patches that are to be reserved on U.S. Forest Service lands, Research Natural Areas, State Parks, and streamside management zones."

These references individually and collectively indicate a strategy designed for federal lands and to not affect private lands beyond that which is consistent with private landowner objectives.

[*F5] In evaluation of the preferred alternative, Alternative B (and its clones, Alternatives C&D, the Forest Service did assume cooperation (and thus support) from BLM and National Parks. Without such assumed cooperation, they noted they would have to downgrade their high viability (Chapter 2, pages 58 and 75; Chapter 3&4, page 52). No such consideration was given to contribution from other ownerships in evaluating the multi-resource strategy. In fact, the Forest Service specifically discounted private lands as low viability without consideration of, and in direct conflict with, the management guidelines presented in the multi-resource strategy. Why is one alternative given the benefit of the doubt, and the [sic] not only not given the benefit of the doubt, but given a negative assumption?

Reply - The assumptions for management of other federal and private lands is the same for all alternatives. As noted in the reply to *F4 above, there are no actual standards and guidelines in the strategy indicating otherwise. As an additional point; NFPA representatives were advised at a meeting on November 15, 1991, that even if there were standards and guidelines for private lands, they would not be considered in the analysis of Alternative E because the Forest Service had no authority to apply the strategy to other than National Forests. In the absence of legislation or binding agreements regarding management of private lands, we could not assume other standards and guidelines applicable on private lands for our analysis.

Note also that the "full Alternative B" only applies to National Forests as well. The analysis shown for Alternative B does not include the "full ISC strategy".

[*F6] Similarly, in discussing criterion 1, change in owl habitat, the Forest Service (even under their overly conservative interpretation of our plan) shows that in 150 years the multi-resource strategy provides for 93% of current habitat (Chapter 3&4, page 64). That is without any credit for other land ownerships! Their preferred alternative (Alternative B) has only 112% of current habitat. The full Alternative B provides for only 15% greater habitat than a part of Alternative E, the multi-resource strategy. It seems likely that our strategy when considered in full, will provide for considerably more acreage under management for owl habitat than the alternative preferred by the Forest Service, and that habitat will be more widely distributed than focused in patches on National Forests.

Reply - The analysis is clear that the numbers referred to here just include National Forests. The commenter's own reference to Alternative B shows it (and the other alternatives) was analyzed with the same assumption. It is true that the "full Alternative B" provides for 15% more habitat over the long run as Alternative E, but, as noted in the reply to #5 above, the "full Alternative B" applies only to National Forests. Implementation of the "full ISC Strategy" across all ownerships would have much more than Alternative B. We see no standard and guideline indicating that Alternative E will in fact provide "more acreage....for owl habitat" than that provided by Federal lands.

[*F7] An exception to the above discussion might be the recognition of the importance of intervening lands for dispersal habitat. The Forest Service notes that both alternatives, our Alternative E and the preferred Alternative B, provide standards for dispersal habitat. However, even though Dr. Thomas has testified that the dispersal standards in the multi-resource strategy and the ISC strategy are essentially equivalent, the Forest Service praises one (Alternative B) and discounts the other (Alternative E). For their preferred alternative they describe dispersal habitat as "...a major provision that substantially enhances the occupancy rates [in HCAs] of spotted owls...." (Chapter 2, pages 59-60). For Alternative E, they first note that we have a dispersal habitat standard, but then they immediately and apparently completely dismiss its value because it does not cover the full range of the owl.

Reply - The FEIS wording difference on pages 2-59 and 2-60 are because under Alternative E, the dispersal habitat requirement does not apply to the entire range of the northern spotted owl. This is a particular problem relative to the EIS's stated purpose to "...ensure the northern spotted owl's viabilityas required by NFMA and its implementing regulations." These regulations require maintaining viability "well distributed throughout the planning area". The viability analysis did indeed consider the dispersal standards of the two strategies essentially equivalent on that portion of the range where they applied.

[*F8] For the above to be valid, one must first accept the rather convenient assumption that the historical range of the northern spotted owl is the same as national forest boundaries! Even given this assumption, the multi-resource strategy's owl management zone and its dispersal habitat standards cover 85% of the owl's range (and as note [sic] before provides 93% of current habitat for the long-term). Further, Alternative B provides dispersal habitat for all ownerships. How is it possible then to rank our dispersal habitat strategy lower than that provided for under the preferred alternative. Once again, if examined in total, it seems likely that the multi-resource strategy would at least meet or even exceed the performance of the preferred alternative.

Reply - As noted in the Reply to paragraph *F7 above, dispersal habitat in Alternative E was rated equivalent to that in Alternative B, where it applied. As noted in the reply to *F4 above: a.) there appear to be no standards and guidelines that would require private lands to provide dispersal habitat; b.) there appear to be no proposed legislation or agreement that would assure the standards and guidelines will be followed by the myriad of landowners involved; and, c.) the commenter understood our analysis would include only National Forests when it was presented. Further, the overall rating was based on seven criteria. The stated comparability of "93" percent vs "112" percent is not the

whole difference between the HIGH and LOW viability rankings between Alternatives B and E respectively.

[*F9] Thus, if evaluated in total, on all ownerships, it is likely that the multi-resource strategy would rank at least in the "moderate" viability category, more likely in the "high" viability category.

Reply - See replies to comments *F4 through *F8 above, and to replies to *F13 and *F16 below which explain the basis of the viability rankings.

II. Connecting Habitat was incorrectly interpreted as only dispersal habitat.

[*F10] In the evaluation of our multi-resource strategy, the Forest Service notes that "Connecting habitat corridors between Deferred and Reserved MPAs might provide for higher densities of northern spotted owls that in dispersal habitat." (Chapter 3&4, page 82). However, nowhere [sic] in the evaluation of this strategy is there given any consideration for additional owls or owl nesting, roosting and foraging habitat in these Connecting Habitat zones. They are treated only as dispersal corridors. (See Summary, pages 10 and 15; Chapter 2, page 4; Chapter 3&4, page 70). Yet, our multi-resource strategy provides specific management guidelines for the maintenance of nesting, roosting, and foraging habitat in these areas.

Reply - Connecting habitat was considered to provide for owl habitat and for pairs. Specifically, these areas were considered in the estimates of potential change in the amount of habitat, criterion 1 of the viability analysis and in the habitat capability analysis, criterion 3. Based on the standards and guidelines for this alternative, we assumed that these areas would have a average of 40 percent nesting, roosting and foraging habitat (FEIS 3&4-52).

[*F11] Both the preferred alternative (Alternative B) and our multi-resource strategy (Alternative E) recognize the value of maintaining additional pairs of owls between habitat reserve areas (HCAs and MPAs). Alternative B approaches this by providing for additional smaller clusters of owl pairs (ISC strategy Category 2 HCAs). Our strategy provides for a continuous band of nesting, roosting, and foraging habitat (that is twice the width of the average home range diameter by province) from one MPA to the next. This will provide for the maintenance of multiple pairs of owls between MPAs.

Reply - It is not appropriate to consider these areas as "continuous". The comparison between category 2 HCAs, where there will not be significant habitat alteration, and the connecting habitat is inappropriate. The connecting habitat was assumed to provide an average of 40 percent nesting, roosting and foraging habitat. In accordance with the standards and guidelines for connecting habitat, there was to be habitat alteration through management.

[*F12] However, in their evaluation of alternatives, the Forest Service accepts the Category 2 HCAs (supporting 2 to 19 pairs of owls), but totally discounts the contribution of over 297,000 acres of connecting habitat. For example in calculation of "nearest neighbor" distances (Chapter 3&4, pages 82-83) they include the distance between both category 1 and 2 HCAs for Alternative B (and C & D). But, for Alternative E they use only the

distance between MPAs and note that Connecting Habitat was "...not considered in measurements between designated areas." (Chapter 3&4, page 82). If they had, as one would assume they should have, then our multi-resource strategy would have surpassed all strategies for nearest neighbor as we provided for a continuous habitat linkage.

Reply - Connecting Habitat was not considered equivalent to a designated area for the distance calculations because it does not provide for multiple pair clusters of owls. However, the contribution of connecting habitat was considered in the FEIS (see reply to *F10 above). Further, it is important to consider that there is no empirical evidence that supports the idea that juveniles will follow the corridors. This was discussed in the FEIS, 3&4-80.

[*F13] Even so, with their analysis of only part of our strategy, the spacing (nearest neighbor distances) in our multi-resource strategy falls well within the dispersal distances of 89% of radio-tagged juvenile owls for the 1st nearest neighbor (MPA to closest MPA), 70% for the 2nd nearest neighbor (MPA to second closest MPA), and even 50% for the third nearest neighbor (MPA to third nearest MPA) showing significant redundancy (Table 3&4-18). How can this lead to low viability?

Reply - The spacing issue was not the factor that lead to an assessment of a LOW viability rating for this alternative. Spacing is only one of the seven criteria used to assess viability. As stated in the FEIS on page 3&4 - 47, "None of the criteria can be used independently to assess population viability. The inter-relationships of the criteria must be considered when assessing population viability."

[*F14] It is also important to note that the 297,623 acres designated as Connecting Habitat in our multi-resource strategy, and treated by the Forest Service analysis as only dispersal habitat, currently support 1,206 known owls, including 529 known pairs. And, half of these owls are known to be reproductive pairs.

Reply - Currently there are 1,304,000 acres nesting, roosting and foraging habitat and 614 pairs of owls in Connecting Habitat. As stated above, the value of Connecting Habitat was recognized and considered in the viability analysis.

[*F15] Connecting Habitat is a significant element of this strategy. It is an alternative approach (and likely at least an equivalent approach) to the designation of Category 2 HCAs. Yet, it is incorrectly treated as only dispersal habitat.

Reply - This is inaccurate. See the reply to number *F11 above.

III. Cluster size and spacing are incorrectly characterized as being below standards accepted and published in the literature.

[*F16] Dr. Thomas, in his December 23, 1991, written testimony to the Endangered Species Committee, was asked to categorize the difference between the ISC strategy and our multi-resource strategy for three key elements (habitat standards for dispersal, cluster size, and distance between clusters). His response was "The differences in these characteristics vary from slight to non-existent." How then is it

conceivable that Alternative B is ranked "HIGH" in viability, and Alternative E is ranked "LOW"? All of our MPAs (clusters) exceed our standards (based on the published literature) and fall well within spacing requirements specified in the literature. We also have provided for enhanced dispersal through management guidelines for the owl management zone to further boost the viability of the clusters.

Reply - Dr. Thomas made this statement in reference to the standards and guidelines for the Multi-Resource Strategy. However, the analysis of the actual mapping of the alternative, which was conducted by the timber industry representatives, did not attain the goals established in the standards and guidelines (see the reply to comment number *F19 below). Further, this is only a partial picture. To assess viability, all relevant factors must be considered. For example other factors such as distribution and clustering should be considered. Alternative does not provide for a well distributed population as was evaluated in criterion 2 of the viability analysis. Further, the majority of the MPAs, 32 of 41 are estimated to provide for less than 15 pairs (FEIS 3&4-90).

[*F17] In their review of the literature, the ISC notes (Thomas et al. 1990:24) that "...empirical and modeling results both suggest that clusters of 15 to 20 pairs should be stable over the long term, even given low to moderate rates of dispersal among them by juvenile owls..." The standards for MPAs in the multi-resource strategy adopt this published guideline, exceeding 15 to 20 pairs for all except those in California. Yet, the Forest Service has stated in numerous places that our MPA "... clusters are smaller than the size specified in the scientific literature as necessary for long-term persistence." (Summary, page 22; Chapter 2, page 62; Chapter 3&4, page 99).

Reply - The standards and guidelines for Alternative E do call for 15 to 20 pairs areas, but the analysis indicates that the actual mapped MPAs presented with this alternative do not reach this goal (FEIS 3&4-90).

[*F18] In California we adopt a smaller standard (must exceed 10 pairs), because we have instead proposed full landscape management rather than a reserve system. Throughout California, we recommend management for nesting, roosting, and foraging habitat (same as Connecting Habitat in Washington and Oregon), rather than limiting this type of habitat management solely to reserved areas. Yet, the Forest Service gives no credit to this higher standard of management in their viability rating of Alternative E.

Reply - The contribution to the owl afforded by connecting habitat is accounted for in the habitat capability analysis and the estimates of future amounts of habitat. Because the connecting habitat was assumed to have 40 percent nesting roosting and foraging habitat, it did provide for more owls and more habitat than the dispersal habitat of Alternative B. In the Klamath Province, the habitat capability was 177 for the matrix under Alternative B, and 243 for connecting habitat for Alternative E (FEIS 3&4-75). Also, the standard given here "must exceed 10 pairs" is different from the standard presented on page 11 of Appendix K--"at least . . . 10 pairs".

[*F19] The size of the MPAs in the multi-resource strategy were calculated based on formulas presented in the ISC strategy (Thomas et al 1990:Appendix

I). In all cases, when actually mapped, the area of each MPA exceeded the minimum specified by our guidelines based on published literature.

Reply - The mapped MPAs did not consistently meet the specified standards. For example, in the Klamath Province, 9 of 25 MPAs had less total acres than called for under the standard for Alternative E (data on file in the administrative record and provided to Northwest Forestry Association on February 13, 1992).

Further, the calculation used to determine MPA size did not account for variances in site specific situations. Although this is not explicit, we assumed that the above reference to the ISC Report, Appendix I, page 198 referred to the formula:

HCA size = 20 pairs X median annual home range size X 0.75.

However, this is only part of the method used by the ISC to determine the size of the HCAs. The paragraph following the formula (ISC Report, 198) states, "This estimate was then compared with the one independently derived from known owl densities in the region under consideration. When these values differed considerably, the areas were re-examined to resolve the discrepancy (see appendices M and Q for more details on this procedure). If further adjustments were made in HCAs to assure at least 20 pairs, they were based in such conditions as inclusions of significant areas of unsuitable habitat, high elevation, extensive fragmentation, and checkerboard ownership."

The formula used in Alternative E is based on the formula presented in the ISC, however, this formula was not the complete method used by the ISC. Thus, it is misleading to indicate that the methodologies of the ISC and Alternative E are the same. Alternative E does not compensate for site specific factors as was done under the ISC strategy in determining size of areas.

[*F20] Forest Service data¹ show that there are at least 567 known pairs of owls (1,286 total owls) protected within our mapped MPAs. There are an additional 529 known pairs (an additional 1,206 total owls) in Connecting Habitat areas that will be maintained over the long term. Seventy percent of these pairs are known to be actual or probable (territorial) reproductive pairs. To supplement these, there are an addition 934 know pairs in the outlined forest matrix (owl management zone) between these designated areas (an additional 2,042 total owls).

Reply - As noted in the reply to number *F14 above, it is inappropriate to assume that these numbers will be maintained over the long term in connecting habitat. Under the standards and guidelines, harvesting of habitat is allowed which will reduce the amount of habitat available for owls.

[*F21] In evaluating habitat capability, effective cluster size, and long-term owl numbers the Forest Service chose to employ a new procedure that has not been published before nor apparently peer reviewed. As fully explained in the attached review letter by Dr. Steven P. Courtney, the model, underlying the procedure explained in part in Appendix B, has absolutely no statistical rigor. He notes two key areas of concern, either of which would result in the model's rejection if it were submitted for professional publication -- statistical significance is much lower than that normally accepted as standard, and the procedures used (liner [sic] regression instead of curvilinear [sic], and regression with the necessary transformation of percentage data) were not appropriate. He reanalyzes the data using acceptable techniques and demonstrates the results are not statistically acceptable.

Reply - As noted in the above comment, the review letter by Dr. Courtney was attached with the submission of this letter and addressed the habitat capability modeling. The issues raised in the letter by Dr. Courtney are addressed here, and thus no response appears directly with that letter.

There are several points in this comment that can be addressed:

(1) Lack of peer review. The procedure for analyzing habitat capability resulted from a series of meetings attended by knowledgeable biologists and was reviewed by two peers, one of whom (Eric Forsman) was a member of ISC. The process used to develop this procedure was documented in the documents made available to the commenter, along with the names of all those involved.

(2) No statistical rigor. The habitat capability model was developed using widely accepted statistical techniques. Rigorous procedures were used throughout, as documented below.

(3) Statistical significance lower than standard. There is no generally accepted standard for statistical significance. Many prominent biometriicians prefer the reporting of actual P-values rather than blind application of $P > 0.05$ or $P < 0.05$ as the test of significance. Accordingly, the one-tailed P-values we report for the two regression equations are $P = 0.076$ for Oregon/California provinces, and $P = 0.027$ for Washington. No one would question the significance of the Washington results. The P-value for Oregon/California is slightly greater than 0.05, the standard put forward by Dr. Courtney. Considering that this relationship was based on a small sample ($n = 9$), a P-value of 0.076 would be taken as evidence of a likely relationship between the dependent and independent variables by most researchers, especially in light of ancillary evidence that the relationship is real.

(4) Use of linear regression. It is possible that a non-linear relationship between home range area and proportion of habitat may better describe the underlying relationship than a linear relationship. However, the available data are insufficient to justify such a model. When more samples are available, the data should be reexamined to see if nonlinear approaches provide a better fit. For this approach, the regression was used to estimate slope only within the range of observed proportions of habitat. The regression line was not extended from the observed range to proportions of 0 or 1.0. Rather, as explained in the documentation, the regression line was truncated at both extremes.

(5) Lack of transformation. Arc-sine transformations are appropriate in many cases when the dependent variable is expressed as a percent or proportion. However, biometriicians do not recommend transformation of the independent (X-axis) variable. In this analysis, proportion of habitat was the independent variable, and transformation of this variable was not appropriate.

[*F22] The variables and their relationships in such a model are extremely sensitive to minor variances in data and assumptions, and can yield highly disparate results. As a result, there is absolutely no justification for the Forest Service to abandon the previously published and accepted procedure for these type of analyses in favor of what appears to be a very weak theoretical manipulation. Reliance on the new model and procedures is what led the Forest Service to the incorrect conclusion that many of our

clusters would be too small to hold an adequate number (> 10 in California) of owls over the long term (Chapter 3&4, page 90).

Reply - The habitat capability estimation procedure was developed to provide a consistent and reliable method to estimate potential future expected pair sites. It is unclear what previously published and accepted analysis is referred to in the above comment. The methodology presented in the Multi-Resource Strategy, (FEIS Appendix K-48) are inconsistent from the original source upon which they are based (see the reply to number 19 above). The ISC methodology for calculating size of area needed to support a given number of pairs requires site specific knowledge and professional judgement and thus are not directly replicable.

[*F23] If we discard the ranking of clusters and habitat capability by an obviously inadequate model, and use instead the published and professionally accepted approach reported in the ISC strategy, the MPAs in the multi-resource strategy meet and often exceed the standards set forth in the published literature for a viable long-term strategy for the spotted owl.

Reply - see the replies to numbers *F22 and *F23.

IV. Protection against catastrophic events is only partially analyzed, and thus inappropriately represented.

[*F24] There are a number of natural events that have the potential (no matter how low the probability) to occur a catastrophic level over the long-term. Such events might include fire, insects and disease, flood, wind/storm damage, or volcano. In presenting our multi-resource strategy, the Forest Service states there is "limited latitude for loss of habitat due to catastrophic events because of the narrowness of the band of designated areas managed primarily for spotted owl habitat..." (Summary, page 22).

Reply - This is addressed in the replies for the comment *F25 through *F27.

[*F25] While our strategy does have a designated band of habitat, and arguably in some places this may be "narrow," it is the only strategy that has a defined band of continuous habitat. All other strategies, including the preferred alternative, have no defined band. One could argue that they have no width if you consider only designated units. This is particularly true in the case of the old SOHA system.

Reply - The habitat provided under Alternative E cannot appropriately be called "continuous" (see the Reply to the comment number *F11). The other strategies do not need to "define a band", they cover the range of the owl.

[*F26] However, if you look at Alternative B complete with its standards for Category 2 HCAs between the larger primary system of HCAs, and dispersal habitat in the forest matrix, then you do have a significant habitat width. We argue that the same holistic view can and should be taken for the Connecting Habitats between MPAs, and the dispersal habitat in the owl management zone of the multi-resource strategy.

Reply - Again, the preferred Alternative provides for the owl throughout its range and does not limit the Alternative to a portion of the owl's range.

[*F27] The completely protected reserves identified as Category 2 HCAs may provide better, more widely distributed, protection than the distinct bands of habitat identified in the Connecting Habitat areas. However, you cannot completely discount owls in the owl management zone, as the minimum standards for habitat protection under the ESA still remain. Further, the likelihood of another Mt. St. Helen [sic] type event (which covered only 24,000 acres; Chapter 3&4, page 19) occurring in exactly the right position (on top or across our "band") to fully sever the habitat linkage is very very small.

Reply - Habitat and owls are accounted for in the management zones. For example, contribution from the management zone was considered in both in the estimates of potential habitat, criterion 1 of the viability analysis, and in the habitat capability analysis, criterion 3.

Regarding catastrophic loss, while the potential for this occurring may be small, the potential impact is great and needs to be considered in an assessment of viability.

[*F28] Most would probably agree that catastrophic fire is a much more likely event, particularly on the east slope of the Cascades. Our strategy recommends active management to reduce fuels and thus minimize the catastrophic spread of any fire. The preferred alternative makes no such recommendations. In fact it notes that in reserved areas the lack of management will "reduce some desirable structural components of the stand such as large trees and increase the hazard for catastrophic fires... In the absence of preventive measures, habitat will be degraded." (Summary, page 23). The same type of concern and management solution applies to the potential catastrophic spread of insect and disease infestations.

Reply - The preferred alternative requires management plans for each HCA, and thus does provide for site specific consideration of the potential impacts from fire, insects and disease. Further, it is unclear how Alternative E promotes any more fire management than the preferred alternative.

[*F29] An alternative that actively minimizes (manages against) the most likely catastrophic events (fire, insects, disease) must logically rank at a higher viability than any strategy that takes no such preventive measures, but instead admittedly exacerbates these situations by simply setting areas in preserved status. However, the preferred alternative tries to mitigate potential catastrophic events by duplication of areas. Yet, all such reserves still have the higher risk of succumbing to fire storm or pest infestation due to the lack of management. While it is impossible to say that our approach to catastrophic events is better than that presented in the preferred alternative, it is likewise impossible to rank ours any worse than that in the preferred alternative.

Reply - It is desirable for an alternative to consider the threat to fire, insect and disease. The preferred alternative does this, as does Alternative E. However, to imply that because both alternatives provide for fire management that they should also both be rated as resulting in a HIGH likelihood of providing for a viable population is unfounded. Viability cannot be rated on any one factor. This issue was further discussed in the reply to comment number *F13.

V. Southwest Washington and Northwest Oregon -- a distinct difference in strategies, but a debatable influence.

[*F30] This is one area where the preferred alternative is clearly different than that presented in the Multi-resource strategy. It is our professional opinion that the population of spotted owls on the Olympic Peninsula is sufficiently large to have a high probability of survival over the long-term. It is unlikely to "wink out." Further, if any demographic or genetic drift problems occur as a result of its greater degree of isolation than other subpopulations, relatively infrequent (and cost effective) transfers of eggs and subadults should minimize if not eliminate this problem.

Reply - It is unclear what assumptions were used to make the statement that "the Olympic Peninsula is sufficiently large to have a high probability of survival over the long-term". Under Alternative B, this would be an appropriate statement, not under Alternative E.

The reference to artificial propagation is an available option. However this type of intensive hands-on management is usually used as a last resort to save a species from extinction. Such measures are viewed as high risk because of the amount and frequency that individuals of the species would have to handled. Without adequate amounts of quality habitat available to transfer northern spotted owls into, success of introduction and reintroduction programs is limited. Another concern is the lack of available owls for such action. If habitat is not available in sufficient amount and distribution then spotted owl populations are expected to be low in all areas and thus there will not be surplus owls for transfers. The risk to the species, balanced with the low likelihood of success does not result in a high priority for action.

Protecting habitat and populations in the wild is the first step to recovering a species from threatened or endangered status.

[*F31] The Forest Service clearly takes a different approach to this area. They assume that the subpopulations in this area, under a higher degree of isolation, will have a much higher likelihood of localized extinction. This however, as Dr. Thomas is fond of saying, is "theory not fact." Further, to assume that these potential local extinctions will "...result in a substantial risk to the viability of spotted owls" is a much greater assumption -- theory not fact. To develop a very costly management strategy that would over time develop linkages to this area on the basis of supposition is not warranted, especially when alternatives exist. Habitat linkages do not now occur, and it will be a long time (to 100+ years) for it to grow into habitat even under the preferred alternative. Thus in this respect, there is no short-term difference (<50 years) in our multi-resource strategy, Alternative E, and the preferred strategy, Alternative B.

Reply - The statement that there is no short-term difference between Alternative B and E is a unfounded. There is a substantial difference between Alternative B and E. Alternative E allows greater declines in habitat than Alternative B. For example, under Alternative E there is continued harvest on the Olympic Peninsula to a greater degree than B. On the Olympic Peninsula, under Alternative B there are 231,000 acres of nesting, roosting and foraging habitat unavailable for timber production (FEIS 3&4-67). On the Olympic Peninsula, under Alternative E there are 155,000 acres of nesting, roosting and

foraging habitat unavailable for timber production (FEIS 3&4-67). Thus, there are an additional 76,000 acres of nesting, roosting and foraging habitat that could be harvested under Alternative E. This is in an area where that has long been recognized as an area of concern for the owl.

VI. The multi-resource strategy is inappropriately scored negatively due to its reliance on previously designated reserves (National Parks and Wilderness Areas).

[*F32] The Forest Service notes that overall 39% of our MPAs are wilderness, 100% in Olympia, and 40% in Washington Cascades (and thus a lot less in other provinces). (Chapter 3&4, page 63). They imply that the mere fact that an area has a major component of wilderness makes it inferior habitat. The value of wilderness for spotted owl habitat has been debated at length in the literature, and continues to be the subject of scientific investigation. That is why we spent considerable effort to discuss this very issue in our alternative, and to report on studies that demonstrate the biological viability of habitats in Wilderness areas.

Reply - As you acknowledge, there is debate over the quality of owl habitat in wilderness. Because of this debate, it was discussed in a qualitative manner to provide full disclosure to the public and the decision maker. A recent peer reviewed report indicates that the quality of habitat is less in most Wilderness (Bart and Forsman, in press); therefore the fact that an area has a major component of Wilderness should be displayed. However, the acres used in the viability analysis were considered equal.

[*F33] Further, because the debate continues, we took the conservative route and limited our use of wilderness areas and National Parks to the suitable habitats within those areas as designated by the Forest Service suitable habitat maps. We were also careful to overlay maps of known owl pair locations on the suitable habitat maps, to gain additional insight as to where to locate our MPAs. Finally, it was our intent, and was written into our standards for establishment of MPAs, that the MPAs include a complete range of suitable elevations.

Reply - The Forest Service maps do not display suitable habitat within National Parks. Elevation of the MPAs was not evaluated in the FEIS.

[*F34] It is improper for the Forest Service to assume, as we have been told they have by a member of the FEIS team, that we pushed our MPAs to high elevation wilderness areas, and that these areas are thus low quality habitat. And, it is inappropriate for them to further assume that, even though our mapped MPAs had high numbers of known owl pairs, the owls in these MPAs must arbitrarily be discounted as they will not be supported (will die off in above average numbers) over the long term. Thus, the claim that most of our MPAs will not contribute to the viability of the owl is an exaggerated assumption without the support of fact.

Reply - No one on the ID team would suggest that the reason that high elevation sites are low quality is because the MPAs were placed there. Rather, these areas are likely to be low quality habitat because of the habitat conditions of these high elevation sites. This is supported by the recent work of Drs. Bart and Forsman (manuscript in press).

However, as noted in reply to number *F32 above, acres within the MPAs were considered to provide to the viability of the owl.

VII. Alternatives B, C, and D are credited with future enhancement as a result of new silviculture research, but Alternative E is not given the same assumption.

[*F35] In evaluating the value of the matrix in Alternatives B, C, and D, the Forest Service recognizes that habitat capability may improve over time if silvicultural research is effective (Chapter 3&4, page 74). However, the same credit is not given to the owl management zone and Connecting Habitat (our matrix lands between MPAs) of Alternative E even though these lands would be managed at the same (owl management zone) or higher (Connecting Habitat) standards than Alternative B. Instead, any such credit is relegated only partially to only those lands in Research MPAs. What is the justification for such an uneven/partial evaluation?

Reply - In the Multi-Resource Strategy, the only place that silvicultural research for maintaining, creating or accelerating habitat is mentioned in reference to Research MPAs (FEIS Appendix K-50, see definition of Research MPAs).

In the ISC strategy, silvicultural research is to be done in the forest matrix (FEIS 2-24). For both alternatives, mention of the potential benefits is discussed in a qualitative manner.

[*F36] The calculations for habitat capability appear unwarranted. As noted above we have the same or better standards for habitats between reserved areas. In addition, our standards are for all ownerships, while those for the preferred Alternative B are for federal lands only. Yet, we are credited with only 44 extra pairs of owls, over Alternative B, throughout the entire three-state region! The managed habitats in northern California alone far exceed that.

Reply - The assumption for owl management on other lands was the same for all alternatives. As discussed in the replies to comments numbered *F4 through *F9, only Forest Service lands were analyzed in detail for this EIS on management for the northern spotted owl in the National Forests.

FOOTNOTES

¹ Forest Service GIS data provided February, 1992, to the NFPA/AFC Wildlife Committee Spotted Owl Subgroup under a FOIA request.

ENCLOSURE

Enclosed with these comments was a facsimile copy of a letter and enclosure from Steven P. Courtney reviewing "Modeling Habitat Capability for Northern Spotted Owls" by Marcot and Raphael. It was referred to in comment *F21 and Reply. It is enclosed at the end of this Appendix following the draft article by Anderson and Burnham.

RESPONSE TO COMMENTS RECEIVED FROM CALIFORNIA FORESTRY ASSOCIATION

The following indented text is a verbatim representation of the facsimile received February 28, 1992 by the Department of Agriculture from John E. Hofmann of the California Forestry Association addressed to Edward R. Madigan.

Secretary Edward R. Madigan
Department of Agriculture
12th and 14th Streets, SW
Washington, D.C. 20250

Dear Secretary Madigan:

This letter constitutes our comments regarding the Forest Service's EIS for the northern spotted owl. These comments are limited and brief, however we wish to emphasize that all of our comments on the draft EIS are still valid. The final EIS has done little to address those concerns.

Reply - The comments received on the Draft EIS were the basis for a number of comments and responses in Appendix L.

The range of alternatives are inadequate. Alternatives B, C & D do not represent a range, but varying degrees of the same alternative - all ISC based. There is no need to combine the ISC with critical habitat proposal since either alone constitutes a viable plan. Combining both plans in their entirety results in over kill and therefore not a reasonable alternative for consideration. The same comment applies to Alternative D since it proposes extensive additions to an already viable plan.

Reply - This issue was addressed in the FEIS in the response to the first comment on page L-A-14 which states, "It is a common misconception that NEPA requires an agency to consider a wide, or full, range of alternatives. What is required is that the agency explore and evaluate, 'all reasonable alternatives' which respond to the 'underlying purpose and need' (40 CFR 1502.14(a) and 1502.13). The alternatives presented in Chapter 2 in this environmental impact statement meet these requirements." Alternatives C and D also met the underlying purpose stated on page 1-1 of the FEIS.

Alternative E was not seriously considered as an alternative. Serious consideration would have included a Section 7 request for consultation from the Fish and Wildlife service. Alternative E offers the greatest opportunity for multiple-use management and should have been utilized to the maximum extent possible.

Reply - Alternative E was analyzed and displayed in the FEIS in the same manner as all other alternatives considered for detailed study. The consultation process is independent of the process of considering an alternative in detail. Alternatives A, B, C, and D were considered in equivalent detail in the DEIS; Alternatives A, B, C, D and E were considered in equivalent detail in the FEIS.

The northern spotted owl range includes diverse habitat conditions; physical and elements of risk. It also includes two USFS regions which historically provided different management emphasis. No effort has been made to recognize those differences. It may be appropriate to select

different alternatives for different provinces or localities within a given province.

Reply - This issue is addressed in the response to the last comment on page L-A-28 of the FEIS which states "The interdisciplinary team considered the variation in spotted owl habitat and home range size between physiographic provinces. Local knowledge and experience with spotted owl habitat was relied upon for the delineation of northern spotted owl nesting, roosting, and foraging habitat in each National Forest."

With respect specifically to California, the reply to the last comment on page L-A-15 of the FEIS states: "All currently available information from the scientific literature and from the 1991 field season was used in preparing the DEIS and FEIS. The development of a separate EIS, and separate alternative, for California was considered in the DEIS, but those alternatives were eliminated from detailed study (see Chapter 2, "Alternatives Eliminated from Detailed Study"). The interdisciplinary team concluded that, as in the DEIS, it is not necessary to prepare a separate document or alternative for California lands in order to examine alternatives that will ensure the long-term viability of the northern spotted owl. See also discussion on the northern spotted owl in this appendix and in Chapter 3&4 of the FEIS. (Other comments requesting that standards and guidelines should be different for the National Forests in California are addressed elsewhere in this appendix.)"

The FEIS does not include recent findings. In a letter to the Fish and Wildlife service, dated June 20, 1991, the California Department of Fish and Game documented over 11,000 sightings in California with over 1,475 known owl territories, 500 of which occur on private lands. The 1991 survey results had not been included at the writing of this letter. We assume similar incomplete data were used for Oregon and Washington.

Reply - This issue is addressed in the response to the second comment on page L-A-26 of the FEIS which states "The preparation of this EIS included a review of relevant scientific studies that have been published or are still in progress since the ISC published its Conservation Strategy. Appendix D, Annotated Bibliography, provides a summary of published and unpublished reports reviewed. No conclusions on spotted owl biology or habitat needs were changed from the ISC Report after reviewing this literature.

"New information from ongoing studies in northern California and the east side of the Washington and Oregon Cascades might help clarify habitat use and characteristics in these provinces after these studies are completed, analyzed and peer reviewed.

"In addition, northern spotted owl habitat acres were updated in this document to represent the most recent information from each National Forest"

This issue is also addressed in the response to the second comment on page L-A-27 of the FEIS which states "The interdisciplinary team used the most recent information available on spotted owl numbers that represented results of surveys during the past years, or historic totals as reported by a variety of sources (BLM, FS, NPS, Tribal agencies, and State wildlife agencies)".

Further, Forest Service owl inventories reflected new data collected through October 1991. The information on known owls in California presented in the FEIS (3&4-21) indicates that there are 932 pairs of owls, 235 of which are on

private lands. Thus, the figures used in the FEIS indicate that there are slightly higher numbers of territorial owls than documented in the comment above, (1,864 vs 1,475).

Salvage within HCA's should be encouraged. Although the ISC committee did not recommend salvage, the Fish and Wildlife Service clearly approves of the practice. It is our understanding that salvage will be an allowed activity in critical habitat units. The Fish and Wildlife service recommended a pro-active approach to reduce catastrophic risk and improve unsuitable owl habitat in its letter of informal consultation.

Reply - This issue is addressed in the response to the second comment on page L-A-49 of the FEIS which states "Salvage logging is permitted under Alternative A in accordance with approved SOHA management plans. For Alternatives B, C, and D, recurring salvage logging is not allowed under the ISC Strategy. Any proposals for salvage logging due to special circumstances must be evaluated on a case-by-case basis by the Oversight Team and Steering Committee to determine if the action is consistent with ISC Strategy".

One reason logging is not permitted is described in the reply to the second comment on page L-A-47 which states in part: "Research is needed to define the essential components of habitat. Spotted owl nesting, roosting, and foraging owl habitat is very complex; the key flying squirrel prey-base feeds on a fungus dependent on the litter layer; suppressed or understory trees seem to be primary perching places; the mix of size classes, openings, and debris such as down logs and limbs function in complex ways to provide for food for the owl and the owl prey species while at the same time not favoring other species that would successfully compete with the spotted owl for these components of the habitat. Silvicultural treatments clearly providing more benefit than risk may be approved early. Examples may be precommercial and early commercial thinning, or treatments of fuelbreaks and stands prone to catastrophic insect and/or disease outbreaks. But until spotted owl habitat is more fully understood, protection of stands in a manner known to favor owls, e.g., no treatments, is what the ISC Strategy recommends."

In addition, fire management plans will be developed for each of the HCA's in accordance with the standards and guidelines for alternative B.

Finally, the U. S. Forest Service has invested enormous amounts of time and money in timber sales which were not sold prior to October 1, 1990. These sales have since been dropped from the timber sale program. In California, at least 177 MMBF in fully prepared sales have been withdrawn. We ask that these sales be exempted and allowed to proceed.

Reply - Timber sales will be allowed to proceed under the standards and guidelines of the selected alternative.

Thank you for the opportunity to comment on the final spotted owl EIS.

Sincerely,

/s/John
John B. Hofmann
Director of Resources
Public Lands Division.

COMMENTS RECEIVED AFTER MARCH 3, 1992

The following enclosed comments from Judith Shulman of Pharos Corporation on behalf of the Early Winters Resort, were received by the Northern Spotted Owl EIS Team in Portland OR after March 3, 1992 when the record of decision was signed.

Because of the well-publicized requirement by the court to have the revised standards and guidelines in place by March 5, 1992, it was not possible to provide specific responses to these comments. However, after careful reading of the letter, it presents the same issues which were covered in the letter from Harry P. Hosey, presented on page A-24 of this Appendix, and addressed in the responses to that letter.



4
Overbay

February 21, 1992

BY FACSIMILE

George Leonard
Associate Chief
USDA Forest Service
P.O. Box 96090
Washington, D.C. 20090-6090

ccp

Dear Mr. Leonard:

Consistent with our recent telephone conversation, I enclose a summary of the Early Winters Resort proposals for resolving the spotted owl issue. As stated, the project wants to be judged on the question of whether an HCA should have been identified, in light of the issuance of a permit, Forest Service protocol, and ISC guidelines. We believe we can prevail on this issue of substance, but we do not want to battle over the process. The upcoming Record of Decision seems to us to be the only way to assure this.

Of course, our strong preference is for the Forest Service to eliminate the HCA in the Record of Decision, as a result of considering our detailed comments and the evidence. If there is any way to decide now whether to carve out this HCA from Alternative B, it would save substantial time and money for Early Winters and the Forest Service.

Please call at any time to discuss the enclosed document, or this issue generally. We are eager to work with the Forest Service to find a workable solution to this difficult problem.

Very truly yours,

PHAROS CORPORATION

Judith A. Shulman
Judith A. Shulman

REC'D FOREST SERVICE

FEB 25 1992

CHIEF'S OFFICE

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EARLY WINTERS RESORT
PROCESS FOR RESOLVING SPOTTED OWL ISSUE

February 21, 1992

A. Question of Whether an HCA Should Have Been Identified.

Early Winters Resort planned for development in Washington State includes a ski mountain in the Okanogan National Forest, Sandy Butte. The entire proposed ski mountain development falls within a Category 3 Habitat Conservation Area (HCA). Early Winters Resort submitted formal written comments on the Forest Service Draft Environmental Impact Statement On Management for the Northern Spotted Owl in National Forests (DEIS). The Final EIS (FEIS) addresses some of the Early Winters comments but does not address the two most critical comments, specifically:

1. There has never been a known pair of owls on Sandy Butte (that is, the data does not support the establishment of an HCA in accordance with Forest Service protocol and ISC guidelines).
2. The permit of Early Winters Resort issued by the Forest Service in 1984 precludes inclusion of Sandy Butte within an HCA.

In essence, Early Winters Resort has raised a relevant issue, challenging whether the Forest Service should ever have identified an HCA at Sandy Butte. At a minimum, and as required by NEPA, these comments should be addressed.

B. The Preferred Alternative in the FEIS Does Not Provide a Mechanism for Eliminating or Reconsidering an HCA.

Alternatives B, C, and D in the FEIS refer at Chapter 2-33 and 2-34 to an Adjustment Process. This adjustment process discusses a technical review team that will continue as a working group to review proposals referred to them from member agencies to determine consistency with the ISC strategy. This technical review team does not have clear authority to respond to the question of whether an HCA was properly identified, or whether an HCA should be eliminated. In fact, there has never been a process in which a claim such as the one raised by Early Winters Resort can be reviewed.

C. The Solution Requires Action in the Record of Decision.

As required by NEPA, the comments of Early Winters Resort must receive a response. Even though the FEIS has been issued, the response can be in an appendix to the Record of Decision on the Management for the Northern Spotted Owl in the National Forests (Record of Decision), perhaps together with responses received after the deadline. The response to the comments can generate a discussion in the Record of Decision and the issue can be disposed of in one of two ways:

1. Consider the evidence as requested in the Early Winters Resort comment letter, and make a determination as to whether the HCA was improperly identified, and, if so, carve out the Sandy Butte HCA (as US Fish & Wildlife did when considering critical habitat areas) in the Record of Decision; or
2. State clearly in the Record of Decision that the Technical Review Team shall have the authority to determine whether a particular HCA was properly identified and eliminate and HCA if it was not.

D. Early Winters Resort Should Not Have to Continue to Fight About Process.

For more than 10 years, Early Winters Resort has been fighting issues of process, and has never had an opportunity to be judged on its substance. If Sandy Butte rightfully was identified as an HCA, which Early Winters disputes, there is no economically feasible resort alternative. If Sandy Butte should not have been identified as an HCA, Early Winters Resort deserves to proceed with the substantive analysis.

The Forest Service has a legal opportunity now to correct an error with minimal attention, if the evidence supports the claim. Likewise, the Record of Decision can establish a different process. On the other hand, if the Forest Service waits and the technical review team eliminates the HCA even though it does not clearly have the authority, Early Winters Resort will be forced once again to litigation over process, which at this time will certainly kill any prospect for this most important project in Washington State.

EXHIBIT A

DRAFT
APPENDIX C

DEMOGRAPHIC ANALYSIS OF NORTHERN SPOTTED OWL POPULATIONS

David R. Anderson
Kenneth P. Burnham
Colorado Cooperative Fish and Wildlife Research Unit
Colorado State University

1. INTRODUCTION

The 1990 Status Review (Anderson et al. 1990) provided estimates of the rate of population change for populations of northern spotted owl in northern California (Willow Creek and surrounding Regional Study Area) and southern Oregon (the Roseburg Study Area). The population of resident female owls in these areas was shown to be declining at a significant rate. By the fall of 1991, there were two additional years of capture-recapture data on these two populations, and three new areas (Medford in southern Oregon, H.J. Andrews near Corvallis, Oregon, and the Olympic Peninsula in northwestern Washington) had sufficient years of capture-recapture data to warrant an intensive analysis. More than 2,000 individuals had been marked and the resighting probability for adult females was approximately 0.8 to 0.9.

This appendix provides estimates of the rate of population change of resident territorial females in these five large study areas. Analysis methods (e.g., model building, model selection, tests of model fit, parameter estimation, and inference procedures concerning the rate of population change) are those used in Anderson et al. (1990) with some extensions. The key references on methodology are Burnham and Anderson (in prose) and Lebreton et al. (in 1992). The analysis of data was done during September-October, 1991, during two intensive workshops held in Fort Collins, Colorado. The analyses were completed by six biologists working on the northern spotted owl, two French scientists and two professors from Colorado State University with special expertise in the analysis of capture-recapture data, and two U.S. Fish and Wildlife Service employees from the Colorado Cooperative Fish and Wildlife Research Unit.

TABLE C-1. SUMMARY INFORMATION ON THE FIVE DEMOGRAPHIC STUDY AREAS.

NAME OF STUDY AREA	APPROXIMATE SIZE (SQ. MI.)	YEARS OF MARKING	TOTAL INDIVIDUALS MARKED
Northwest California	4,000	1985-91	400
H.J. Andrews (Western Oregon)	116	1987-91	358
Medford (Southwestern Oregon)	4,050	1985-91	703
Roseburg (Southwestern Oregon)	1,700	1985-91	589
Olympic Peninsula (Northwestern Washington)	965	1987-91	302

2. RESULTS AND DISCUSSION

Two parameters are of critical interest: λ = finite (i.e., annual) rate of change in the size of the population of resident, territorial females, and ϕ = annual probability of survival of adult females. Maximum Likelihood estimates of these parameters are shown as $\hat{\lambda}$ and $\hat{\phi}$, respectively, along with estimates of their precision (i.e., $se(\hat{\lambda})$ and $se(\hat{\phi})$). If the number of resident females is "stationary," then $\lambda = 1$, while if the population is declining, the $\lambda < 1$. Thus, there is interest in testing the null hypothesis $H_0: \lambda \geq 1$ against the alternative hypotheses $H_1: \lambda < 1$. Proper estimation of λ answers the critical question, "Have the resident, territorial females replaced themselves?"

a. Parameter Estimates for Individual Study Areas

The estimation of λ was based on the Leslie-Lefkovitch approach summarized in Anderson et al. (1990). Under this method, estimates of age-specific survival and fecundity are needed for the female component of the population. Model selection for the estimation of survival probabilities relied on the Akalke Information Criterion (AIC). However some use of likelihood ratio tests was made. Data from the five study areas supported only two age classes for annual survival estimates (juvenile and all older classes = "adults"). Estimates of these parameters and measures of their precision are presented in Table C2.

TABLE C2. ESTIMATES OF AGE-SPECIFIC ANNUAL SURVIVAL RATES FOR FEMALE NORTHERN SPOTTED OWLS

STUDY AREA	FIRST YEAR		ALL LATER YEARS	
	$\hat{\phi}_1$	$se(\hat{\phi}_1)$	$\hat{\phi}_1$	$se(\hat{\phi}_1)$
Northwest California	0.1946	0.0509	0.8507	0.0224
H.J. Andrews (Western Oregon)	0.3112	0.1033	0.8365	0.0312
Medford (Southwestern Oregon)	0.2002	0.0513	0.7854	0.0258
Roseburg (Southwestern Oregon) ¹	0.2829	0.0366	0.8583	0.0131
Olympic Peninsula (Northwestern Washington) ¹	0.0707	0.0282	0.8603	0.0264

Estimates of age-specific fecundity of females also followed the procedures in Anderson et al. (1990), and these are summarized in Table C3 with a measure of the precision of the estimates.

¹ No sex-specific differences in adult survival were detectable, thus, the estimate of adult female survival includes adult males.

TABLE C3.

ESTIMATES OF AGE-SPECIFIC FECUNDITY(b) FOR FEMALE NORTHERN SPOTTED OWLS
(NUMBER OF JUVENILE FEMALES/FEMALE OF AGE X).

STUDY AREA	SUBADULT 1 (12 MOS.)		SUBADULT 2 (24 MOS.)		ADULT (36 MOS.)	
	(b̂₁)	se(b̂₁)	(b̂₂)	se(b̂₂)	(b̂)	se(b̂)
Northwest California	0.1154	0.0576	0.2286	0.0659	0.3576	0.0245
H.J. Andrews (Western Oregon)	0.1430	0.0780	0.1430	0.0780	0.3270	0.0500
Medford (Southwestern Oregon)	0.1110	0.0386	0.1110	0.0386	0.3233	0.4880
Roseburg (Southwestern Oregon) ^b	0.0938	0.0547	0.0938	0.0547	0.3304	0.0385
Olympic Peninsula (Northwestern Washington) ^b	0.1000	0.0667	0.1000	0.0667	0.3327	0.0784

Estimates of λ computed from the estimates in Tables C2 and C3, estimated precision, and test statistics related to the null hypotheses (above) appear in Table C4. While there are several potential biases in these estimates, it is clear from Table C4 that the population of resident, territorial females has declined in each of the five study areas. The simple average of the estimates was $\bar{\lambda} = 0.9022$ which indicates a rate of decline of approximately 10 percent per year during 1985-1991. Thus, the resident population was not replacing itself in any of the five large study areas. This is a critical finding. In each case λ is significantly less than 1 (see test statistics and p-values in Table C4.). No statistical inference is made concerning λ prior to these years of study or in the future. These estimates of λ represent a 5- or 6-year "snapshot" of the average annual change in the female component of these five populations.

TABLE C4.

ESTIMATES OF THE FINITE RATE OF ANNUAL POPULATION CHANGE (λ) FOR FEMALE NORTHERN SPOTTED OWLS IN FIVE INDEPENDENT STUDY AREAS THROUGHOUT THEIR RANGE. ALSO SHOWN ARE TEST STATISTICS AND P VALUES FOR THE TEST OF THE NULL HYPOTHESIS THAT $\lambda \geq 1$ VS. $\lambda < 1$.

STUDY AREA	λ	se(λ)	t or z	p
Northwest California	0.9153	0.0433	-1.9561	0.0252
H.J. Andrews (Western Oregon)	0.9276	0.0437	-1.6567	0.0488
Medford (Southwestern Oregon)	0.8444	0.0304	-5.1184	0.0000
Roseburg (Southwestern Oregon)	0.9405	0.0182	-3.2692	0.0005
Olympic Peninsula (Northwestern WA)	0.8828	0.0280	-4.1857	0.0000
Simple Average & t-test	0.9021	0.0173	-5.7532	0.0024
Simple Average & z-test	0.9021	0.0153	-6.4155	0.0000

The t-test is based on the empirical variance among the five independent estimates of λ while the z-test is based on the theoretical standard error of λ (i.e. $\sqrt{\sum \text{var}(\lambda_i)/5}$). The t-test allows for significant variation in λ within the five study areas, however, a test for such variation was not significant $\chi^2 = 3.1409$, 4 df, $P=0.2731$, see Burnham et al. 1987:264-269). The estimated standard error of the true λ across the five study areas ($\hat{\sigma}_\lambda$) was 0.0267 (95 percent confidence interval is 0.0 - 0.1073). Both tests

^b Year-specific differences in (b).

indicate a strong rejection of the null hypothesis, and one must conclude that these populations are declining.

Capture-recapture methods allow estimates, of the number of new entries into the population of resident, territorial females (standard Jolly-Seber estimates. See Anderson et al. (1990:35-36). Estimates of this quantity, averaged over years, are provided in Table C5. Study of the results of these analyses indicated that statistically significant immigration had occurred each year in all five study areas. The estimates of the number of new entries (\bar{B}) provide insight into how populations in each area have been augmented by immigration from outside the study areas. These findings are consistent with those in the 1990 Status Review.

b. Meta-analysis

The majority of the capture-recapture data come from adult birds (i.e., nonjuveniles) and therefore a sophisticated attempt was made to model and understand these data for each of the five study areas. Models of capture-recapture data must properly treat two types of parameters: conditional survival probabilities (ϕ) and conditional recapture probabilities (p) and how these vary across study areas (g). Age was not a factor in this analysis as only adults were treated, and sex was not a factor as only females were of particular interest. For theoretical reasons, much of the analysis was done on $\text{logit}(\phi)$ and $\text{logit}(p)$, where, in general, $\text{logit}(\theta) = \log_e(\theta/(1-\theta))$. The parameters ϕ and p might vary by year (t), and models were derived to allow for this effect. Time (t) in years was considered in two ways. First, the notation t denoted any significant variability in ϕ or p over years. Second, T was used to denote a linear trend time in either $\text{logit}(\phi)$ or $\text{logit}(p)$. Thus, a model allowing survival probabilities to vary across areas (g) and recapture probabilities to vary across years was denoted as (ϕ_g, p_t) .

TABLE C5. ESTIMATES OF THE AVERAGE ANNUAL NUMBER OF NEW ENTRIES (\bar{B}) INTO THE ADULT POPULATION AND THE ESTIMATED AVERAGE POPULATION SIZE (\bar{N}) OF NORTHERN SPOTTED OWLS.^a

STUDY AREA	\bar{B}	$\text{se}(\bar{B})$	\bar{N}	$\text{se}(\bar{N})$
Northwest California	14.76	0.84	49.71	2.46
H.J. Andrews (Western Oregon)	15.57	1.48	60.06	4.15
Medford (Southwestern Oregon)	54.97	3.26	91.80	7.87
Roseburg (Southwestern Oregon)	36.69	2.21	99.68	7.57
Olympic Peninsula (Northwestern WA)	24.44	1.06	51.20	3.56

More complex models allowed several effects to be considered in a likelihood framework. An asterisk (*) denoted independent factors (e.g., $g*t$ indicated that year-dependent parameters were incorporated in a model separately for each study area). Models employing a logit-linear structure were denoted by a "+" (e.g., $g+t$ would indicate a model whereby study area was indexed by dummy variables, and parameters across time would be parallel on a logit scale) (see Honier and Lemeshow 1989). In all models, a log-likelihood ($\text{log}(L)$) was used as the basis for statistical inference and estimation of model parameters was based on Maximum Likelihood methods. The model selection method (AIC) was objective: neighboring models were explored using likelihood ratio tests.

Using the conventions above, either ϕ or p could be modelled in eight ways, $g*t$, $g+t$, $t*g*T$, $g*T$, T , g or the null case, denoted -. combinations of these eight structures of ϕ and p lead to 64 models of the five data sets on adult

^a Estimates of \bar{B} and \bar{N} and measures of precision were made using program JOLLY (see Pollock et al. 1990).

females. Table C6 presents the number of model parameters, $-2 \cdot \log_e(L)$, and AIC for each of the models considered.

While the AIC-selected model was $(\phi_T, p_{t,T})$, some neighboring models were tested to allow a deeper understanding of the data. These tests retain a very general model structure for the recapture probabilities. Three tests were of particular interest:

Test 1. $(\phi, p_{t,T})$ vs. $(\phi_0 p_{t,T})$, $\chi^2 = 11.9666$, 5 df, $P = 0.035$.

Here, one concludes that there is significant year-specificity in adult female survival.

Test 2. $(\phi, p_{t,T})$ vs. $(\phi_T p_{t,T})$, $\chi^2 = 4.930$, 1 df, $P = 0.026$.

Here, one concludes that there is a significant linear trend in $\text{logit}(\phi)$.

Test 3. $(\phi_T, p_{t,T})$ vs. $(\phi_0 p_{t,T})$, $\chi^2 = 7.036$, 4 df, $P = 0.134$.

Here, one concludes that there is no reason to use four additional parameters to let ϕ vary by year, when a linear trend is satisfactory.

Finally, a Wald test (2-sided) of the significance of the slope in the relationship between $\text{logit}(\phi)$ vs. T is:

$z = -2.287$, $P = 0.011$. Thus, one concludes that the slope is significant.

This comprehensive analysis indicated a decreasing trend in annual adult female survival rate for the populations in the five study areas (Table C7). This finding is important because λ is critically influenced by the adult female survival (i.e. juvenile survival and fecundity are relatively less important in their influence on λ). Because the evidence strongly indicates that ϕ decreased during the 1985-91 period, one must infer that λ also decreased over this period. That is, the rate of population decline was accelerating during the study period.

TABLE C6.

SUMMARY OF STATISTICS RELATED TO MODEL SELECTION, BASED ON 64 MODELS.
 FOR EACH MODEL THE THREE TABLE ENTRIES ARE NUMBER OF MODEL PARAMETERS,
 $-2 \cdot \log(L)$, and AIC. THE BEST MODEL IS INDICATED BY THE BOX.

Recapture rate, p								
Survival rate ϕ	g*t	g+t	t	g*T	g+T	T	g	-
g*t	47 1664.54 1758.54	36 1681.92 1753.92	31 1700.07 1762.07	36 1874.01 1746.01	32 1683.27 1747.27	28 1701.75 1757.35	31 1686.76 1748.76	27 1705.23 1759.23
g+t	36 1672.76 1744.76	20 1694.44 1734.44	16 1713.53 1745.53	20 1689.23 1729.23	16 1698.32 1730.32	12 1715.82 1739.82	15 1703.48 1733.48	11 1719.62 1741.61
t	31 1673.82 1735.82	16 1702.36 1734.36	11 1721.30 1743.30	16 1691.92 1723.92	12 1705.49 1729.49	8 1722.69 1738.69	11 1708.83 1730.83	7 1725.85 1735.85
g*T	36 1674.09 1746.09	20 1696.88 1736.88	16 1714.06 1746.06	20 1690.32 1730.32	16 1698.65 1730.65	12 1717.14 1741.14	15 1701.63 1731.63	11 1720.15 1742.15
g+T	32 1677.43 1741.43	16 1705.04 1737.04	12 1719.75 1743.75	16 1696.17 1728.17	12 1706.48 1730.46	8 1723.24 1739.24	11 1710.89 1732.89	7 1726.14 1740.14
T	28 1678.54 1734.54	12 1711.22 1735.22	8 1725.85 1741.85	12 1698.96 1722.96	8 1714.22 1730.22	4 1730.82 1738.82	7 1716.35 1730.35	3 1732.83 1738.83
g	31 1678.39 1740.39	15 1708.71 1738.71	11 1721.44 1743.44	15 1701.81 1731.81	11 1714.77 1736.77	7 1729.76 1743.76	10 1715.12 1735.12	6 1729.90 1741.90
-	27 1679.11 1733.11	11 1712.14 1734.14	7 1726.42 1750.42	11 1703.89 1725.89	7 1719.31 1733.31	3 1735.57 1741.57	6 1719.33 1731.33	2 1735.60 1739.60

TABLE C7.

ESTIMATES OF AVERAGE ADULT FEMALE SURVIVAL (ϕ) DURING 1985-91 FOR THE NORTHERN SPOTTED OWL, BASED ON THE BEST MODEL OUT OF 64 FOR THE POOLING OF DATA ACROSS THE FIVE STUDY AREAS.

YEAR	ϕ	se(ϕ)
1985-86	0.8880	0.0242
1986-87	0.8727	0.0202
1987-88	0.8556	0.0157
1988-89	0.8367	0.0124
1989-90	0.8158	0.0146
1990-91	0.7929	0.0231

c. Biases in λ

Estimates of juvenile survival have been contentious because estimates are biased low if some juveniles leave the study area, survive a full year, and never return to the study area. To the extent that these three events happen, juvenile survival is underestimated, and estimates of λ are too low (i.e., the true value of λ is probably larger than estimated).

Two approaches were employed to obtain more reasonable estimates of juvenile survival, $\phi_j = 0.311$, $se = 0.103$) was used (Cases 1 and 2 in Table C8).

First, the maximum estimate of juvenile survival from the five study areas ($\phi_j = 0.311$, $sse = 0.103$) was used (Cases 1 and 2 in Table C8).

TABLE C8. ESTIMATES OF THE FINITE RATE OF ANNUAL POPULATION CHANGE (λ) FOR THE NORTHERN SPOTTED OWL OBTAINED BY POOLING ALL THE DATA ACROSS THE FIVE STUDY AREAS. CASES (EXPLAINED IN THE TEXT) MAKE DIFFERING ASSUMPTIONS ABOUT JUVENILE SURVIVAL RATES.

CASE	YEARS	FEMALE SURVIVAL RATE	ϕ_j	λ	$se(\lambda)$	z	P
1	1985-86	declining	ϕ_{max}^d	0.9813	0.0373	-0.4879	0.3128
1	1990-91	declining	ϕ_{max}^d	0.8857	0.0362	-3.1575	0.0008
2	1985-91	constant	ϕ_{max}^d	0.9259	0.0312	-2.3750	0.0088
3	1985-86	declining	ϕ_{max}^e	0.9805	0.0322	-0.6056	0.2724
3	1990-91	declining	ϕ_{max}^e	0.8844	0.0312	-3.7051	0.0001
4	1985-91	constant	ϕ_{max}^f	0.9246	0.0251	-3.0040	0.0013

Second, data on juvenile survival from the best production year for the Medford and Roseburg areas were pooled to obtain a maximum estimate ($\phi_j = 0.3065$, $se = 0.0764$) and this was used (Cases 3 and 4, in Table C8). The Medford and Roseburg areas are large in size and adjacent to each other. Thus, the number of dispersing juveniles that survived and never returned is minimized in this approach. In each of the four cases, an attempt was made to use a realistic estimate of juvenile survival as one of the estimates affecting λ . Cases 1 and 3 allowed adult female survival to decline, while Cases 2 and 4 used an estimate of the average adult female survival from the pooled data. Table C8 provides estimates of λ , their precision, and test statistics related to a test of the null hypothesis that $\lambda = 1$. In each of the four cases, there was strong statistical evidence of a declining population.

An additional perspective concerning this source of potential bias can be gained by examining the value for juvenile survival necessary to force $\lambda = 1$ (with the same adult survival and fecundity values). The large increases in juvenile survival, shown below, seem unfounded.

STUDY	$\phi_j \lambda = 1$	% INCREASE
Northwest California	0.49	151
H.J. Andrews	0.60	93
Medford	0.89	345
Roseburg	0.53	87
Olympic Peninsula	0.52	632
Average	0.61	190

^d The survival rate of juveniles was used for the area with the highest survival rate.

^e The year with the highest survival was used for the Medford and Roseburg area, thus the emigration was lowest.

Senescence is another potential problem: unaccounted for senescence leads to overestimation of λ . Likewise, it seems clear that fecundity is overestimated each year and this overestimation is more severe in years of poor production. This source of bias in λ also tends to overestimate λ .

Sandland and Kirkwood (1981) note that the recapture probabilities can be correlated and this leads to biases in the estimate of survival. This effect was tested, but no evidence of this effect was found. This effect is a minor problem when recapture probabilities are so high (i.e., 0.80-0.90).

In summary, even with optimistic assumptions about juvenile survival rates, the best information suggests that the population of resident, territorial owls has declined, on average, at an estimated rate of 7.5 percent each year during the 1985-91 period and that this rate of decline probably has accelerated in recent years.

3. CONCLUSIONS

Populations of resident, territorial females in all five large study areas have declined significantly, at an estimated average rate of 7.5 percent per year during the 1985-91 period. The parameter most important in λ is the annual survival rate of adult females and this parameter has decreased significantly during the 1985-91 period. Thus, the rate of population decline has probably accelerated.

4. LITERATURE CITED

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FEB-28-92 FRI 12:03 Ross-Mickey

P.02



UNIVERSITY OF OREGON

February 25 1992

Dear Dr. Hutchins,

I have been asked to review statistical aspects of the document "Modeling Habitat Capability for Northern Spotted Owls" prepared by Marcot and Raphael. I recognize the efforts that these authors have gone to in preparing this report, and that they have probably worked with limited time and resources. Moreover I recognize that they are making an attempt to solve important management problems with limited data. Nevertheless I have serious concerns about the procedures and analyses they have used, which do not follow normal scientific standards. To base far-reaching management decisions on this analysis would be most unwise.

I have two main areas of concern about the analysis: the statistical significance of the comparisons; and the actual procedures used. Either of these alone would indicate serious problems with the work.

Statistical significance

As the authors are aware (p.20), the normal standard for acceptance of an hypothesis is 95% surety - that is there is no greater than a 5% chance that the observed relationship is due to chance. The authors have compared habitat quality with home range size. In one case (Wa) the observed relationship had a probability value of 5.5%; in the other (Or) the value is 15.3%. No peer-reviewed journal would accept such a standard of proof. In fact to submit the Or data for publication would risk ridicule.

The real problem is that the data are just too few to perform the sort of analysis the authors present. Moreover the relationship between home range and habitat (while biologically plausible) appears very weak. At best, the authors claim to explain 23.9% of the variance in home range in Wa. Actually, as I argue below, the models are far less successful even than this.

The authors compound their problems by selectively removing two data. Their reasons for doing so (p.6) are that these two data weaken the relationship, and don't fit their model. To throw away information that doesn't fit with a model flies in the face of all normal scientific practice. It is akin to selecting only that evidence that fits a particular point of view, and ignoring all other information. This would immediately be rejected by any journal.

Statistical analysis and Procedures

There are two main problems here: transformation of data; and the regression technique used.

It is standard practice to transform data before analysis. There are several reasons for doing this. Firstly, all the main statistical tools assume that data are normally distributed; if the data are not so distributed, spurious results can occur. Secondly, transformation reduces error due to non-linearity. The authors do not appear to have considered the distribution of their data set, and have not made any of the standard transformations. It is normal practice to perform an arcsine-transformation on percentage data (as in the habitat measure) (see standard texts such as Sokal and Rohlf; Snedecor and Cochran). When such transformations are applied (see below) the conclusions reached by the authors are weakened further.

A major concern about the analysis is the statistic used. Linear regression assumes a straight-line relationship between the two measures; the authors themselves recognize that this procedure can produce 'unrealistically tiny home ranges' (p6) so they stop using it for part of the distribution. In fact it is quite inappropriate to assume a linear relationship. If owls select home ranges with a constant amount of suitable habitat, then halving the proportion of the environment which is suitable should double the home range size. This will produce not a linear relationship but a negative exponential or geometric curve. Therefore, on the null hypothesis of the authors themselves, one would expect a curved, not a linear relationship. In such circumstances it is quite inappropriate to proceed with linear analysis. Moreover other hypotheses may predict curved relationships (e.g. territorial compression; flight capabilities). The appropriate technique is polynomial regression. Below I show that this technique explains more of the variance in home range size than does linear regression; however it does not support the conclusions of the authors concerning home range size at low habitat quality.

In summary, I consider the analysis in the document by Marcot and Raphael to be inadequate as a basis for decision-making. It may be that there is a relationship of some sort between habitat and home range size. Marcot and Raphael have not demonstrated it, and they certainly have not documented that such a relationship is linear. The authors themselves acknowledge that they were working with constraints of time and personnel (p2), and settled for a sub-optimal model; however they fail to point out the uncertainties of their analysis. Responsible decision-making requires some indication of how accurate is the information base used to make decisions. The document authored by Marcot and Raphael is seriously flawed, and would not be regarded by most scientists as acceptable for publication let alone for more far-reaching use.


Steven P Courtney

Assistant Professor

Reanalysis of data of Marcot and Raphael

I append a number of graphs and tables to document the reanalysis of the data using the appropriate transformations and procedures. Although I favor a curvilinear regression method, I have given the analyses for simple linear regression (as used by Marcot and Raphael).

I have given the following analyses for each state:

1. Linear regression as used by Marcot and Raphael. (untransformed)
2. Polynomial regression (untransformed)
3. Linear regression, following arcsine transformation of habitat data
4. Polynomial regression following transformation.
(note the angular transformation of percentage terms into degrees: 0 - 90)

In each case the relationship between habitat suitability and home range size is non-significant. The proportion of the variance in home range size which is explicable on habitat 'quality' varies between 14.5 to 26%. This is not a high level of explanation. The highest levels of explanation are with the polynomial (curved) regressions.

Although it would be premature to make any firm statement on the basis of the data, however they are analyzed, it is interesting that the data for both states show a domed shape under polynomial regression. One possible interpretation is that owls generally do not expand their home ranges beyond a certain size, irrespective of habitat quality. The data also suggest that maintaining 25-40 % of the environment in suitable habitat allows owls to maintain territories of close to normal size.

If further information on this analysis is of interest, I can be reached at 509-346-4511.

Steven P Courtney

WASH-N ATOM LINER

Simple Regression X 1 : Column 6 Y 1 : Column 1

Count:	R:	R-squared:	Adj. R-squared:	RMS Residual:
16	.489	.239	.185	6358.775

Analysis of Variance Table

Source	DF:	Sum Square:	Mean Square:	F-test:
REGRESSION	1	177769986.382	177769986.382	4.397
RESIDUAL	14	566076196.556	40434014.04	0 = .0547
TOTAL	15	743846182.938		

No Residual Statistics Computed

Simple Regression X 1 : Column 6 Y 1 : Column 1

Beta Coefficient Table

Variable:	Coefficient:	Std. Err.:	Std. Coeff.:	t-value:	Probability:
INTERCEPT	18364.897				
SLOPE	-17612.056	8399.516	-.489	2.097	.0547

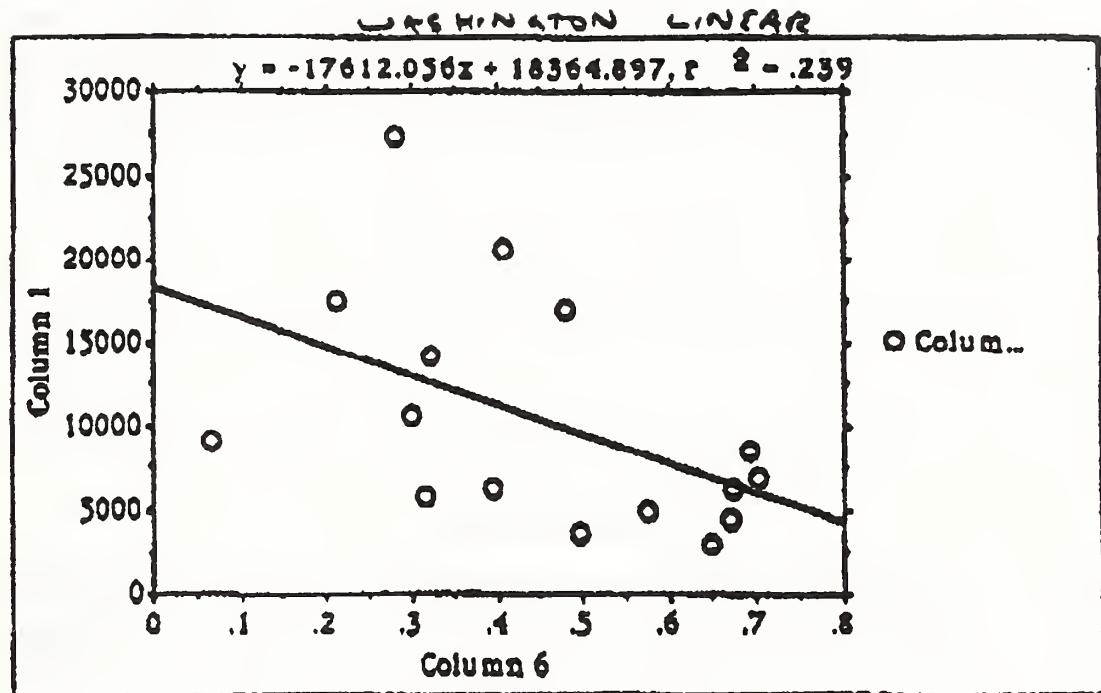
Confidence Intervals Table

Variable:	95% Lower:	95% Upper:	90% Lower:	90% Upper:
MEAN (X,Y)	6980.002	13799.873	7589.713	13190.162
SLOPE	-35629.241	405.129	-32407.695	-2816.417

MAP-02-1958 11:11 FROM SPOTTED OWL SIS TEAM *** TO

W. 15:32Z

32022051758 P. 15



OREGON LINEAR

Simple Regression X 1 : Column 7 Y 1 : Column 3

Count:	R:	R-squared:	Adj. R-squared:	RMS Residual:
9	.519	.269	.164	2346.157

Analysis of Variance Table

Source	DF:	Sum Squares:	Mean Square:	F-test:
REGRESSION	1	14168842.235	14168842.235	2.574
RESIDUAL	7	38531173.765	5504453.395	.p = .1527
TOTAL	8	52700016		

No Residual Statistics Computed

Note. 7 cases deleted with missing values.

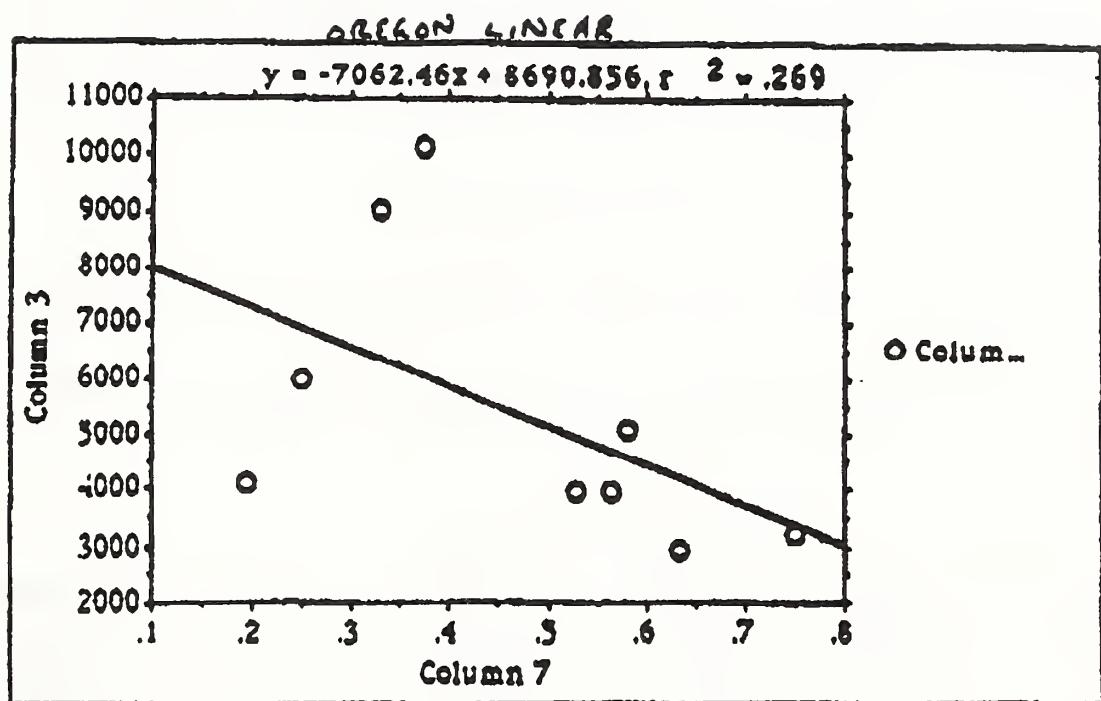
Simple Regression X 1 : Column 7 Y 1 : Column 3

Beta Coefficient Table

Variable:	Coefficient	Std. Err.:	Std. Coeff.:	t-Value:	Probability:
INTERCEPT	8690.856				
SLOPE	-7062.46	4401.958	-.519	1.604	.1527

Confidence Intervals Table

Variable:	95% Lower:	95% Upper:	90% Lower:	90% Upper:
MEAN (X,Y)	3540.836	7239.831	3908.509	6872.157
SLOPE	-17472.774	3347.853	-15403.242	1278.321



WASHINGTON POLYNOMIAL
Polynomial Regression X₁ : Column 6 Y₁ : Column 1

Count:	R:	R-squared:	Adj. R-squared:	RMS Residual:
16	.543	.294	.186	6354.217

Source	DF:	Analysis of Variance Table		
		Sum Squares:	Mean Square:	F-test:
REGRESSION	2	218957154.76	109478577.38	2.711
RESIDUAL	13	524889028.177	40376079.091	0 = .1037
TOTAL	15	743846182.938		

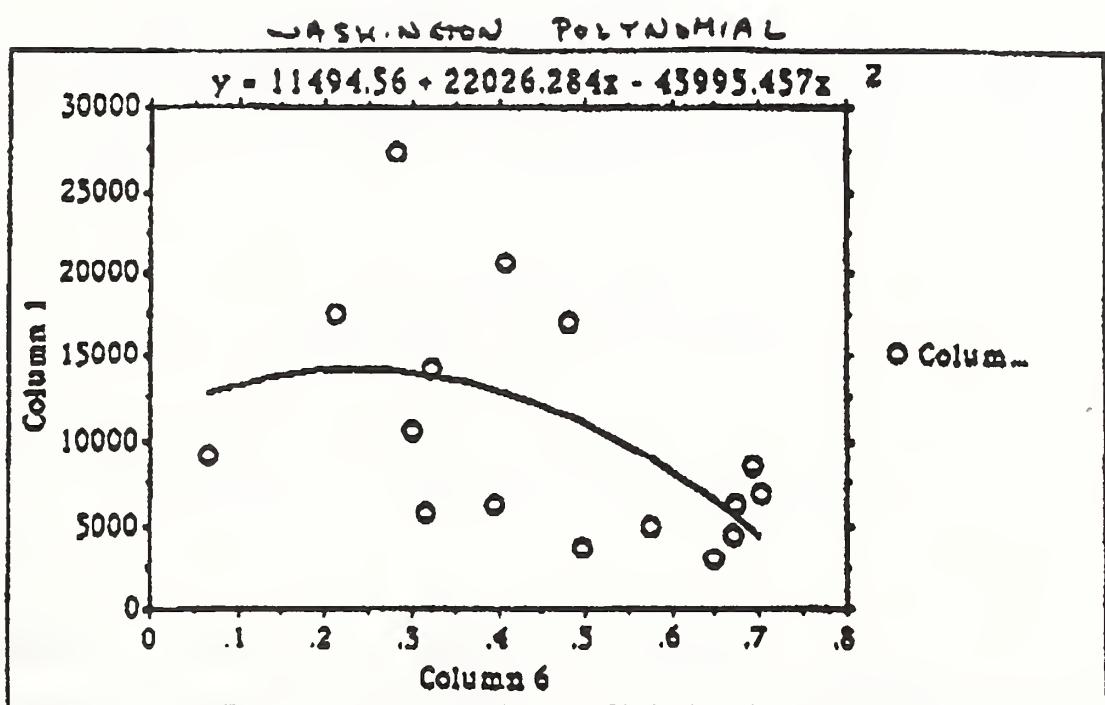
No Residual Statistics Computed

Polynomial Regression X₁ : Column 6 Y₁ : Column 1

Beta Coefficient Table					
Variable:	Coefficient:	Std. Err.:	Std. Coeff.:	t-Value:	Probability:
INTERCEPT	11494.56				
x	22026.284	40133.621	.611	.549	.5924
x ²	-45995.457	45540.316	-1.125	1.01	.3309

Polynomial Regression X₁ : Column 6 Y₁ : Column 1

Confidence Intervals and Partial F Table					
Variable:	95% Lower:	95% Upper:	90% Lower:	90% Upper:	Partial F:
INTERCEPT					
x	-64686.934	108739.502	-49054.88	93107.448	.301
x ²	-144390.45	92399.536	-126652.486	34661.573	1.02



ORECON POLYNOMIAL**Polynomial Regression X 1 : Column 7 Y 1 : Column 3**

Count:	R:	R-squared:	Adj. R-squared:	RMS Residual:
9	.667	.445	.26	12207.474

Analysis of Variance Table

Source	DF:	SUM SQUARED:	MEAN SQUARE:	F-test:
REGRESSION	2	23462363.364	11731181.682	2.407
RESIDUAL	6	29237652.636	4872942.106	p = .1708
TOTAL	8	52790016		

No Residual Statistics Computed

Note: 7 cases deleted with missing values.

Polynomial Regression X 1 : Column 7 Y 1 : Column 3**Beta Coefficient Table**

Variable:	Coefficient:	Std. Err.:	Std. Coeff.:	t-Value:	Probability:
INTERCEPT	1988.889				
x	27247.263	25186.938	2	1.082	.3209
x ²	-37333.884	27033.897	-2.554	1.381	.2165

Polynomial Regression X 1 : Column 7 Y 1 : Column 3**Confidence Intervals and Partial F Table**

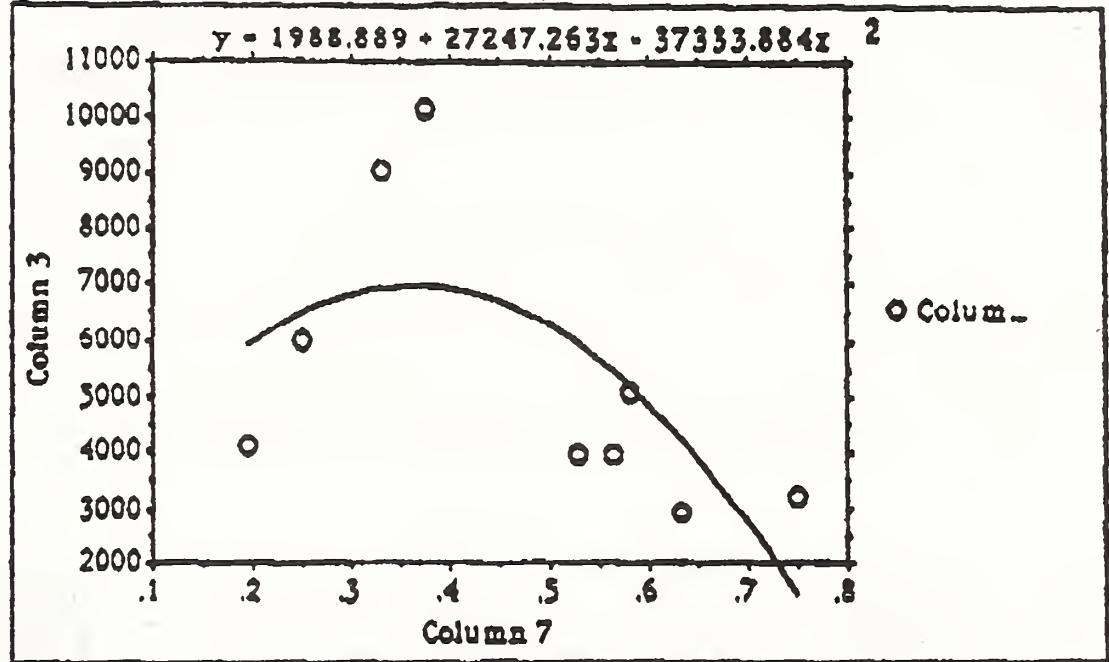
Variable:	95% Lower:	95% Upper:	90% Lower:	90% Upper:	Partial F:
INTERCEPT					
x	-34391.231	88885.758	-31701.111	76195.637	1.17
x ²	-103492.333	28824.565	-89871.645	15203.877	1.907

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EBC-28-92 P.R.1 12:04 X 004131000

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OREGON POLYNOMIAL



WASH. N ATON TRANSFORMED
Simple Regression X 1 : Column 16 Y 1 : Column 1

Count:	R:	R-squared:	Adj. R-squared:	RMS Residual:
16	.461	.212	.156	6468.746

Analysis of Variance Table

Source	DF:	Sum Squares:	Mean Square:	F-test:
REGRESSION	1	158020722.892	158020722.892	3.776
RESIDUAL	14	585825460.046	41844675.718	p = .0724
TOTAL	15	743846182.938		

No Residual Statistics Computed

Simple Regression X 1 : Column 16 Y 1 : Column 1**Beta Coefficient Table**

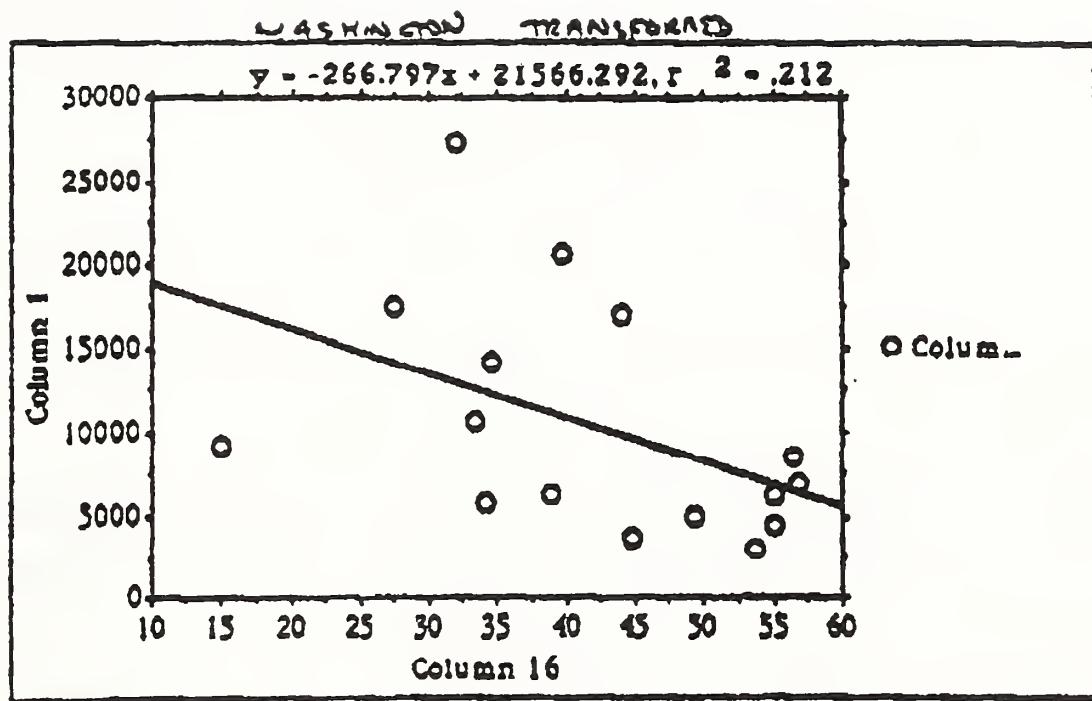
Variable:	Coefficient:	Std. Err.:	Std. Coeff.:	t-Value:	Probability:
INTERCEPT	21566.292				
SLOPE	-266.797	137.292	-.461	1.943	.0724

Confidence Intervals Table

Variable:	95% Lower:	95% Upper:	90% Lower:	90% Upper:
MEAN (X,Y)	6921.029	13858.846	7541.284	13238.591
SLOPE	-561.292	27.697	-508.635	-24.96

MDA-08-1990 11:14 FROM SPOTTED OIL BIR TEAM TO
8-28-92 FRI 12:16 KOBELNICK

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OREGON TRANSFORMED

Simple Regression X₁ : Column 14 Y₁ : Column 3

Count:	R:	R-squared:	Adj. R-squared:	RMS Residual:
9	.502	.252	.145	2373.306

Analysis of Variance Table

Source	DF:	Sum Squares:	Mean Square:	F-test:
REGRESSION	1	13271950.395	13271950.395	2.356
RESIDUAL	7	39428065.605	5632580.801	p = .1687
TOTAL	8	52700016		

No Residual Statistics Computed

Note: 7 cases deleted with missing values.

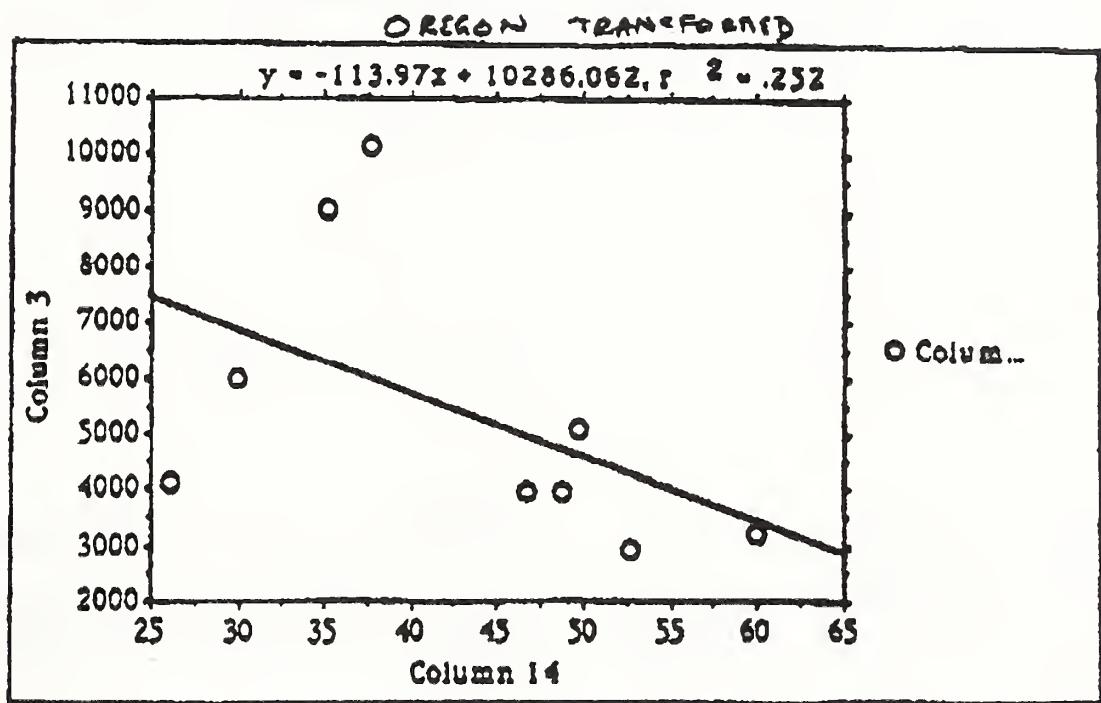
Simple Regression X₁ : Column 14 Y₁ : Column 3

Beta Coefficient Table

Variable:	Coefficient:	Std. Err.:	Std. Coeff.:	t-Value:	Probability:
INTERCEPT	10286.062				
SLOPE	-113.97	74.246	-.502	1.535	.1687

Confidence Intervals Table

Variable:	95% Lower:	95% Upper:	90% Lower:	90% Upper:
MEAN (X,Y)	3519.434	7261.232	3891.362	6889.304
SLOPE	-289.557	61.618	-254.651	26.712



WASHINGTON POLYNOMIAL TRANSFORMED

Polynomial Regression X 1 : Column 16 Y 1 : Column 1

Count:	R:	R-squared:	Adj. R-squared:	RMS Residual:
16	.552	.305	.198	6308.28

Analysis of Variance Table

SOURCE	DF	Sum Squares	Mean Square	F-test:
REGRESSION	2	226319052.529	113259526.264	2.848
RESIDUAL	13	517327139.409	39794394.647	p = .0944
TOTAL	15	743848182.938		

No Residual Statistics Computed

Polynomial Regression X 1 : Column 16 Y 1 : Column 1

Beta Coefficient Table

Variable:	Coefficient:	Std. Err.:	Std. Coeff.:	t-Value:	Probability:
INTERCEPT	3208.385				
X	767.931	799.973	1.327	.96	.3546
x ²	-13.196	10.058	-1.813	1.312	.2122

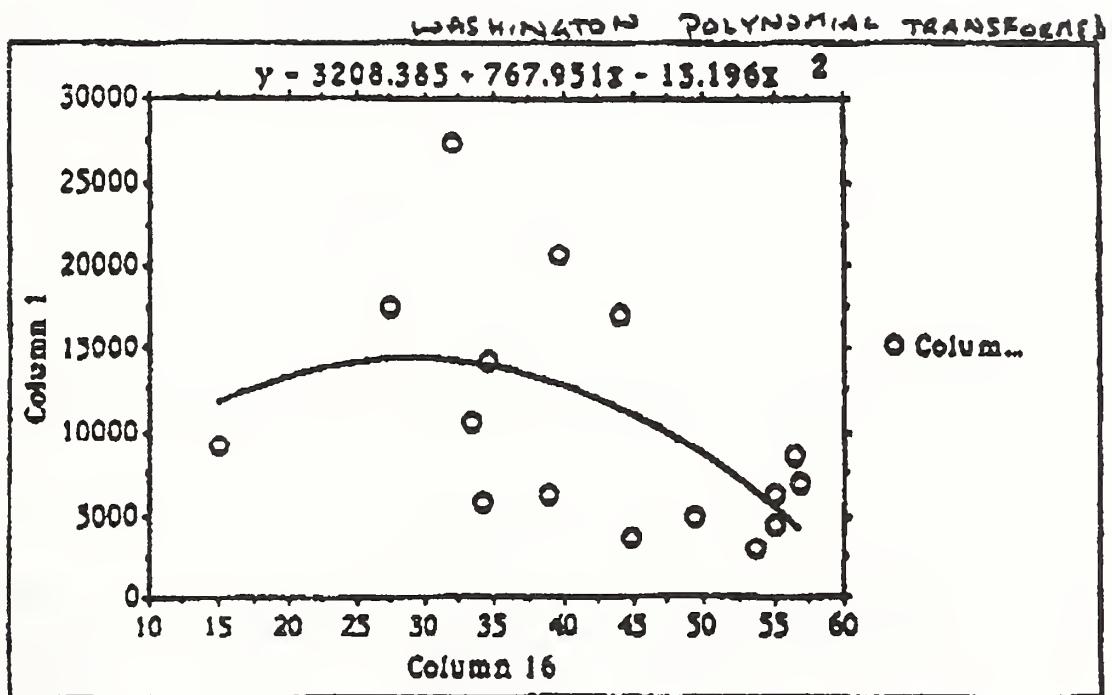
Polynomial Regression X 1 : Column 16 Y 1 : Column 1

Confidence Intervals and Partial F Table

Variable:	95% Lower	95% Upper	90% Lower	90% Upper	Partial F:
INTERCEPT					
X	-960.48	2496.382	-648.89	2184.793	.922
x ²	-34.929	8.536	-31.011	4.618	1.721

14F-02-1992 11:15 FROM SPOTTED OWL E15 TEAM *** TO
FEB-26-92 FRI 12:12 Ross-Mickey

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OREGON POLYNOMIAL TRANSFORMED

Polynomial Regression X | Column 14 Y | Column 3

Count:	R:	R-squared:	Adj. R-squared:	RMS Residual:
9	.667	.444	.259	2209.142

Analysis of Variance Table

Source	DF:	Sum Squares:	Mean Square:	F-test:
REGRESSION	2	23418153.521	11709076.76	2.399
RESIDUAL	6	29281862.479	4880310.413	$p = .1715$
TOTAL	8	52700016		

No Residual Statistics Computed

Note: 7 cases deleted with missing values.

Polynomial Regression X₁:Column 14 Y₁:Column 3

Beta Coefficient Table

Variable:	Coefficient:	Std. Err.:	Std. Coeff.:	t-Value:	Probability:
INTERCEPT	-7287.352				
x	771.702	618.123	3.398	1.246	.2584
x^2	-10.451	7.248	-3.924	1.442	.1994

Polynomial Regression X₁ : Column 14 Y₁ : Column 3

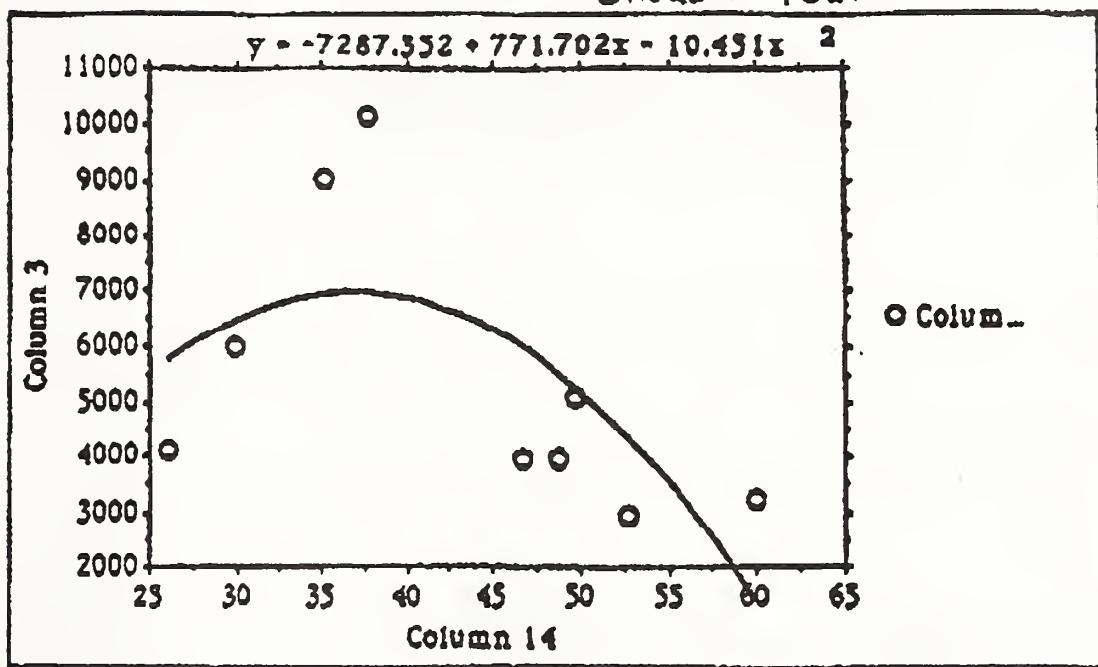
Confidence Intervals and Partial F Table

Variable:	95% Lower:	95% Upper:	90% Lower:	90% Upper:	Partial F:
INTERCEPT					
x	-740.998	2284.401	-429.564	1972.967	1.559
x^2	-28.19	7.287	-24.538	3.639	2.079



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